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Practical Pharmacy Edition

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COVER: Influenza virus is grown in fertile, incubated hen eggs for production of the new vaccine just licensed for civilian distribution. As shown in the photograph, a laboratory worker inoculates the embryonic fluid with a bit of dilute virus. After further incubation, the virus-laden fluid is harvested for processing (*See page 6*).

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AN ORDERLY RECONVERSION

THOUSANDS of pharmacists happily start the new year back on American soil or scheduled for an early homecoming after years at the battlefronts. Other former GI's are eagerly completing their pharmacy training in our colleges. The aim and ambition of most of them, we hope, is toward closing the ranks of retail pharmacy. Where they will practice comes next in importance to exchanging their rifle for a pestle.

Pharmacy will certainly be negligent in its obligations if we do not see to it that the veteran's professional enthusiasm and ideals are not dampened by re-entering the profession through the wrong door. The recent joint conference of the A. PH. A. and N. A. R. D. gave a new twist to this objective by proposing that state associations form special committees to act in an advisory capacity to the Veterans' Administration. Representatives of the two national organizations are now conferring with Gen. Bradley to place such committees on a relationship with the Veterans' Administration similar to that of wartime pharmacy advisory committees to Selective Service.

We know of no better way to encourage the 10,000 pharmacist-veterans to return to the profession and to assure that they will get a helpful welcome.

One thing we hope that veterans, and those who advise them, will keep in mind: There are plenty of opportunities for top-notch ability in retail practice, and this does not mean only at Broadway and Fifth Avenue. There is a job to do for the friendly townsfolk at Main and Garden Streets.

Assuming that a pharmacy has a satisfactory potential volume, the Lilly survey has shown time after time that profits percentagewise will be higher on the average in the smaller communities of less than 20,000 population than in our urban giants. And there is opportunity, too, for prescription practice.

Half the pharmacists reporting from communities of 5000 to 20,000 population filled more than 20 prescriptions per day. Little more than a fourth of us in urban centers hit this figure. Although restricted opportunities for prescription practice showed up in the figures for villages under 5000, 41% of these pharmacists filled 10 to 40 prescriptions daily and 4% filled even more than 40.

There is a good bit more data of this kind on potential income that should be brought together and related to local living costs. We would like to see every state association have brass-tack information on local employment and ownership opportunities, and a procedure for permitting the veteran to evaluate them accurately with reference to his own objectives in pharmacy.

A number of states have already made important progress, such as in Illinois where the state association made a survey of the proprietorship of pharmacies and set up a clearing house for information on prospective buyers and sellers of retail pharmacies. This splendid project was adapted from a similar plan developed in Wisconsin by Jennings Murphy, state association secretary.

We, as individual pharmacists, should promote and back such programs and be ready to answer the veteran's queries about today's opportunities with friendly advice, unsoured by wartime difficulties.

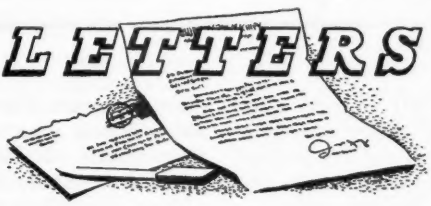
UNJUSTIFIED TRADITION

THE discussion of opening and closing hours in retail pharmacy, going on now for some decades, shows signs of evolving into action. Wartime experiments with more reasonable hours, born of personnel shortages, worked out so well that we may at last break with tradition.

There can be no doubt that an unjustifiably long work week looms large in the eyes of prospective pharmacists and returning pharmacist-veterans, especially since pharmacy lags much farther behind other vocations in this respect now than it did a few years ago.

It is time we clarify the issue by admitting that objections to shorter hours are mainly based on dubious economic and competitive considerations. So long as emergency prescription facilities are available, our professional responsibilities no more require fourteen to sixteen hours seven days per week for adequate service than do those of other public health professions.

Local associations initiating cooperative observance of reasonably shorter hours are to be commended. Pharmacists have well earned this extra bit of time with family and friends.



A. PH. A. — A SOUND RALLYING POINT

Sirs:

November's issue of the JOURNAL was as bountiful as ever in timely facts and information. Certainly the A. PH. A. staff is to be congratulated for the remarkable improvement in this mouthpiece of our profession.

I read with interest the editorial by Dr. Fischelis on the release of pharmacists from the service, and have applied for release under the provisions of W. D. Circular 290, Section III. I have learned, however, that my application has slight chance of approval in Washington despite the fact that I work but five to ten days per month . . . whereas my former employers, the Gorman-Noble Drug Co. of Hackensack, N. J., are in dire need of my services. They have been forced to enlarge their prescription department as a result of a large increase in their professional services . . . .

If there is one thing that I have learned in service, it is the need for a unified front in pharmacy to maintain our professional prestige, and I look to your organization as a sound rallying point.

Staten Island, N. Y. RICHARD C. BOZIAN

FEWER PHARMACISTS NOT HARMFUL

Sirs:

I cannot believe that the decreasing number of pharmacists and pharmacies is harmful to the public health. At the present time, in too many communities, there is still a drugstore on every other corner. They often fill as low as 2 to 5 prescriptions daily and cause unreasonably severe competition.

There have always been too many pharmacists and pharmacies, due to former low standards. It is not necessary to lower the present standards of training to attract capable students, but it is necessary to improve working conditions and salaries and shorten the hours of operation. Let's also remember that in wartime college enrollments always drop by half . . . .

San Francisco SAMUEL J. COHEN, U.S.N.R.

FINE TO BE BACK IN PHARMACY!

Sirs:

I have received my honorable discharge from the Army of the United States under AR 615-365, paragraph 3b. I want to thank you very much for the kind letter you sent in my behalf, for it is my sincere belief that a letter from your organization carries a lot of weight in such a matter. . . . Discharge depends largely on one's camp. The case must be a strong one and meet with several approvals.

It is fine to be back in pharmacy and I assure you that there are plenty of prescriptions to be filled . . . .

Ashland, Va. E. G. MATEER, JR.

APPRECIATION

Sirs:

Many thanks for the attention given to my membership in the AMERICAN PHARMACEUTICAL ASSOCIATION. It is an honor that I shall long enjoy.

May I at this time also tell you how much I enjoyed reading the *Practical Pharmacy Edition*. The article on streptomycin was swell; neither too dry nor technical—just as the name of the book implies, practical.

Can you please let me know when I may expect the *Scientific Edition* of the JOURNAL? . . .

New York, N. Y. GERARD J. MONA

MASKING TASTE OF CHLORAL HYDRATE

Sirs:

May I add to your suggestions in the JOURNAL regarding masking the taste of chloral hydrate, that I have found aromatic syrup of eriodictyon N. F. to be the perfect vehicle...

Washington, D. C. JOHN S. AUSTERLITZ

Sirs:

If you wish to make any additional comment concerning chloral hydrate, I should like to point out that syrup of acacia N. F. is one of the finest vehicles as far as coverage is concerned. This is not so much a case of flavoring, but is due to the colloidal nature of acacia which helps to cover and protect the chloral to the point where it is very well masked...

Philadelphia, Pa. ADLEY B. NICHOLS

HISTORY OF PHARMACY

Sirs:

How and where may I obtain information on the history of pharmacy? . . .

Pittsburgh, Pa. SISTER MARY KEVIN COUGHLIN

Write to Dr. George Urdang, director of the American Institute of the History of Pharmacy, University of Wisconsin, Madison, Wis. One of the best volumes on the subject is "History of Pharmacy" by Kremers and Urdang (J. B. Lippincott Co., Philadelphia; $4.50). An earlier work is LaWall's "Four Thousand Years of Pharmacy," available from the same publisher.—THE EDITOR.

STRAIGHT FROM HEADQUARTERS

by ROBERT P. FISCHELIS, Secretary
AMERICAN PHARMACEUTICAL ASSOCIATION

FOR the first time since 1941 we begin a new year without having our nation actively at war. Although the clouds of war had gathered long before 1941 and we had taken definite sides in the world-wide struggle which was under way, we did not have a full realization of what it meant to have men and women leaving their peacetime employment and concentrating on war production and actually fighting in the various war theaters, until long after December 7, 1941. The stirring events and the bloodshed of the past four years have left their mark on the American economy, on the American home, and on the American way of life.

Although the war is over, in so far as actual fighting at the fronts is concerned, any student of the present situation is well aware of the fact that the issues over which the war was fought and the bases on which the nations of the world are to continue in their respective spheres are far from settled. There are grave and intricate problems to be solved, and in many ways we are not prepared for the solutions which must ultimately come.

A glance about us in our own communities, in our states and toward the national picture reveals anything but harmonious or even relatively complete understanding.

Many of our people are tired, fatigued and worn out. Returning soldiers are tired of army or navy routine. Many are anxious to resume civilian activities and ambitious to make up for time lost on the fighting fronts, but nevertheless feel the need of rest and recreation before going back to civilian work.

War workers, skilled and unskilled, who have worked long hours and taken home bulging pay envelopes cannot be made to feel that there is need for the same concentrated effort which made our production miracles possible. They also feel the need of rest and recreation before going on to something else.

The epidemic of strikes and labor unrest are significant of the let-down which is bound to come after years of spurred action. But this is not a normal situation for the people of the United States. It is a situation which is fraught with danger and significant of changes that are to come. It will probably take some time before most people will realize that there must be a readjustment of work programs, wages, and ways of living.

Markets for consumer goods and services, for housing, for means of transportation, and for recreation are growing and it will take considerable time to satisfy them. The prime wants of the people—food, shelter and clothing—must be met. Along with these comes the inevitable requirement for medical care. People have learned much about what constitutes good medical care during the war years. Those who have been in the military service have had the best that could be supplied. War workers have become accustomed to receiving special attention through industrial health services. The average family in the United States has learned to get along with reduced service from physicians because the number of doctors available had to be prorated on a much higher average of patients per physician than was the case before the war, because almost one-third of the practicing physicians were on military duty.

The President of the United States has taken cognizance of many of the situations here referred to; he has offered to Congress a series of suggestions with respect to the settlement of labor disputes, the control of scientific advances in the field of atomic energy, the housing situation, and he has now made suggestions with respect to the distribution of medical care to all of the people.

He has referred to his various recommendations as an economic bill of rights for the American people, and specifically to the health program as "the right to adequate medical care and the opportunities to achieve and enjoy good health."

His analysis of the present situation in the following words is worth noting:

"In the past, the benefits of modern medical science have not been enjoyed by our citizens with any degree of equality. Nor are they today. Nor will they be in the future—unless government is bold enough to do something about it. People with low or moderate incomes do not get the same medical attention as those with high incomes. The poor have more sickness, but they get less medical care. People who live in rural areas do not get the same amount or quality of medical attention as those who live in our cities. Our new economic bill of rights should mean health security for all, regardless of residence, station or race—everywhere in the United States. We should resolve now that the health of this nation is a national concern; that financial barriers in the way of attaining health shall be removed; that the health of all its citizens deserves the help of all the nation."

Truman's Health Program

The President's proposed program consists of five parts, as follows: (1) Federal financial and other assistance to the states for the construction of needed hospitals, health centers, and other medical, health and rehabilitation facilities. (2) Increased Federal grants to the states for an expansion of public health, maternal and child health services. (3) Federal grants to public and nonprofit private institutions for medical research and professional education in medical and related fields. (4) Expansion of the Federal compulsory social insurance system for prepaid medical care to the masses. (5) Federal protection against loss of wages from sickness or disability. The financing of this program is left to Congress, as to method and amount.

To implement the President's proposal Senator Wagner and Representative Dingell have introduced bills which now supersede the "Wagner-Murray-Dingell Bills" which have been before the Congress for some time, but which have never been made the subject of public hearings.

It is now a certainty that public hearings will be held and medical, dental, pharmaceutical, hospital, nursing and other organizations engaged in supplying medical care will be expected to make their contribution either in favor of the acceptance of the program proposed, or in supplying such modifications as will implement the proposals in a practical manner, and with due regard for the interests of the professions concerned and the people whom they must eventually serve.

Drugs and medicines have so far not been included in proposed Federal compulsory health insurance programs. There are those who have advocated the inclusion of such services and supplies. As long as proposed legislation does not mention these supplies and services it can be assumed that they will continue to be supplied privately.

A study of various state proposals for supplying complete medical care indicates that there is a growing tendency to include medical and health supplies and pharmaceutical services. Organized pharmacy has laid the groundwork for a study of this situation through the appointment of a joint committee of the AMERICAN PHARMACEUTICAL ASSOCIATION and the National Association of Retail Druggists, which made a preliminary report to the Joint Conference of the executive bodies of these two organizations on November 9.

It is to be expected that when serious consideration is given by the Congress to a complete health program which will include the supply of drugs, medicines and pharmaceutical services, organized pharmacy will make its findings on the subject available, and endeavor to safeguard the personal relations between those who need drugs and medical supplies and those who are licensed to supply them.

BOARD DECRIES SIDE LINES UNRELATED TO PHARMACY

Disapproval of the trend in some pharmacies and drugstores to expand into lines of endeavor unrelated to the practice of pharmacy was recorded by the New Jersey Board of Pharmacy at its November meeting.

In the Board's opinion the legislature only granted it authority to issue permits for the operation of drugstores and pharmacies to persons deemed qualified.

The Board deplored the fact that, in some instances, permits are being used as a cloak to carry on unrelated merchandising activities.

Consequently, the Board announced that each application for a permit to conduct a pharmacy or drugstore in New Jersey will be thoroughly investigated and if, in the Board's opinion, the proposed establishment is not a pharmacy or drugstore as contemplated in the statutes the permit may be denied.

AFTER INOCULATION and incubation of the eggs (see front cover), the shell is scissored off over the natural air sac (left) and the membranes and blood vessels ruptured. Blood and virus-laden fluid are then aspirated into a chilled bottle, as shown on the following page.

INFLUENZA VIRUS VACCINE, A AND B

THIS NEW PREVENTIVE AGENT SOON WILL BE AVAILABLE IN RETAIL AND HOSPITAL PHARMACIES, HERE IS THE ESSENTIAL INFORMATION YOU NEED

INFLUENZA vaccine will soon be available through retail and hospital pharmacies for general use by civilian physicians. The National Institute of Health of the U. S. Public Health Service has granted the first licenses for civilian production, and other biological laboratories may be expected to file applications in the near future.

Firms preparing the vaccine for the armed forces can now turn toward civilian production, since the Army completed the vaccination of all personnel early in December. Use of the influenza vaccine in the Army resulted from controlled clinical trials sponsored by the Office of the Surgeon General. These and other investigations show that a significant number of the persons vaccinated are protected against influenza during outbreaks which occur soon after vaccination.

Thus an important step may have been taken toward a means of controlling an ancient disease, the etiology of which has only recently been clarified. It was little more than a decade ago, in 1933, that the British workers, Smith, Andrewes and Laidlaw, established that influenza was caused by a virus. This virus is now known as influenza A virus.

While the work of Smith and his colleagues was confirmed, epidemics of the same disease occurred with which influenza A virus could not be identified. By 1940 Francis had reported the discovery of still another strain of virus, known as influenza B, which can cause the disease; and there may be others.

During the great pandemic of 1917–18 our knowledge of influenza was so incomplete that there are no records to indicate whether it was due to virus A or B or to some other type. The new vaccine is a mixture of types A and B, those known to have caused epidemics in recent years. But there is no way authorities can predict whether or not the vaccine would be an effective aid in combating the virulent, fast-spreading infections such as occurred at the close of the first world war.

Although strains of the virus may differ, Dr. Thomas Francis, Jr., an authority on influenza, has pointed out that when an effective method of producing immunity against any one strain is established the rest will follow.

Early Experiments

Following the isolation of an influenza virus, a number of attempts were made to produce active immunity in animals by inoculation with sus-

pensions of killed or attenuated organisms. Early reports began to appear about eight years ago on vaccination experiments with virus propagated in mouse lungs. Results were generally conceded to be conflicting and inconclusive.

Further work showed that the virus could be grown in the allantoic fluid of embryonated hen eggs. From this virus-containing liquid, preparation of a killed virus vaccine later became possible.

It was demonstrated that vaccine from this source could prevent active infection in laboratory mice which were inoculated intranasally with living virus. Mice protected against virus A did not, however, resist infection with virus B. Obviously both strains would be needed to produce a satisfactory vaccine.

Following successful experiments with B vaccine, and later with a combination of the two strains, trials were cautiously extended to humans. After vaccination, investigators were able to demonstrate immune bodies in the blood. Moreover, the antibody titer was in the same range level as that following an attack of influenza.

On the basis of these encouraging results from carefully controlled experiments, the Army's Commission on Influenza* felt justified in undertaking a more extensive clinical evaluation of the vaccine.

The trial was carried out in Army Specialized Training Program units of eight universities in different parts of the United States and in a ninth group comprising the members of units in five New York medical and dental colleges. The influence of subcutaneous inoculation of the vaccine was determined during an outbreak of influenza A.

Vaccination shortly before or even after the onset of the epidemic exerted a protective effect. A total attack rate of 2.22% was recorded among the 6263 vaccinated and 7.11% among 6211 controls. The ratio of incidence between the vaccinated and control groups was thus 1 to 3.2.

Meanwhile, immunization data holding similar promise became available from other investigators.

Preparation of the Vaccine

Vaccine for the Army has been made by the chick red-cell adsorption method outlined below. First, a bit of highly diluted solution of virus is inoculated into the allantoic sac surrounding the embryo in hen's eggs that have been incubated for eleven or twelve days.

(The PR8 and Weiss strains of influenza A and the Lee strain of influenza B are used in the vaccine, each of the three virus strains being grown separately in different eggs.)

After about forty-eight hours of additional incubation the extra-embryonic fluids are ready for harvesting. The shell over the normal air sac is removed; then the shell and chorio-allantoic membranes and amnion, together with the blood vessels, are torn with sterile forceps.

When the embryo has bled into the fluid containing the virus, this liquid is aspirated with a needle, collected in a bottle, and immersed in an ice bath. Red blood cells from the embryo rapidly adsorb the influenza virus from the extra-embryonic fluid.

By centrifugation the virus-laden red cells are separated, and the supernatant fluid discarded. Next, the soft, gelatinlike mass of red cells is gently rinsed with physiological salt solution.

Elution with physiological salt solution at 37 °C. then separates the virus from the blood cells.

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* The Commission functioned under the Board for the Investigation and Control of Influenza and Other Epidemic Diseases in the Army, Preventive Medicine Service, Office of the Surgeon General, U. S. Army.

NORMAL SALINE is added (left) to the red blood cells which have adsorbed the virus in the embryonic fluid obtained from inoculated eggs, as shown on the preceding pages.

The blood cells are removed and the virus suspension inactivated by a weak solution of formaldehyde. A bacteriostatic agent, such as phenyl mercuric borate 1:15,000, is added to the concentrated vaccine.

The final preparation, usually slightly opalescent with a faint pink tinge, undergoes tests for sterility, antigenic activity and absence of infectious capacity.

Both manufacturing and independent laboratories have been experimenting with possible improvements on the above procedure. Perhaps most significant has been the observation that the virus can be adsorbed on calcium phosphate. This modification promises several advantages over blood-cell adsorption, including higher antigenicity of the vaccine and lower production costs. Another change expected for civilian production is the use of ultraviolet radiation, instead of formaldehyde solution, to kill the influenza virus.

Composition of Vaccine

The vaccine, called "Influenza Virus Vaccine, Types A and B (Refined and Concentrated)," contains a mixture of the two virus types. The two components represent concentrates of equal quantities of extra-embryonic fluid obtained from the eggs.

The type A component consists of equal amounts of the PR8 strain and the Weiss strain. The type B component consists of the Lee strain.

Storage

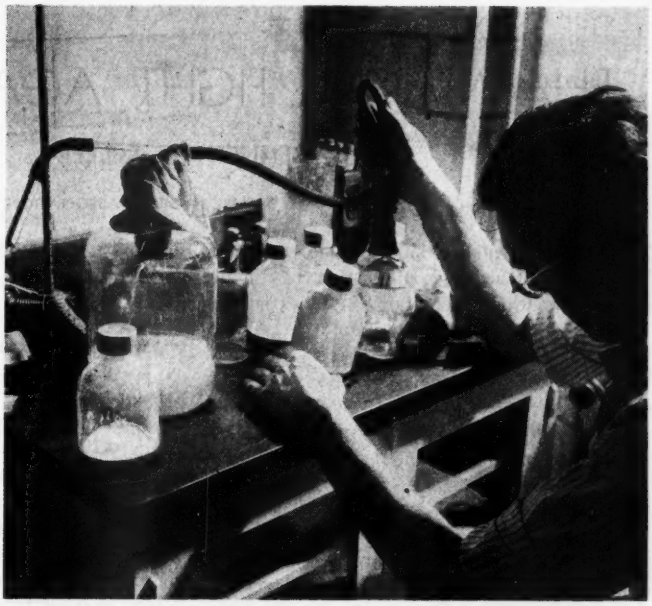
Like other biologicals, influenza vaccine must be stored in the pharmacist's refrigerator between 2 and 10° C., preferably at the lower limit. The vaccine will carry a dating period of one year from the time of manufacture.

It is hoped that improved manufacturing techniques will eventually assure retention of potency over a longer period of time, so that a longer dating period may be specified.

Dosage

The present vaccine concentrate is designed to be given as a single subcutaneous injection of 1 cc. The effect of the vaccine apparently becomes evident in about one week or so after inoculation. There seems to be no evidence at present that a second injection has any significant additive effect to the antibody response produced by a single injection.

Just how long any immunity established remains effective is not yet known. Francis, Salk and their colleagues were of the opinion that a protective influence against induced infections of influenza B was exerted for at least one to four



CRUDE VIRUS remains in the normal saline solution after it has been separated from the red blood cells by elution. A laboratory worker is shown (right) drawing off the crude virus after centrifuging to get rid of blood cells. The photographs on these pages were taken in the laboratories of Sharp and Dohme, one of the producers of influenza vaccine.

months; similar studies on the incidence of influenza A indicated, however, that effective immunity to this type may be considerably reduced after an interval of four months. Hirst and others have expressed the opinion that protection against influenza A may last somewhat longer, judged by antibody levels.

Results so far indicate that the influenza vaccine described significantly increases active immunity by stimulating production of antibodies against specified types of virus. Laboratory data are confirmed by limited clinical experience indicating that the vaccine also significantly reduces incidence of the disease.

Vaccination of all Army personnel, just completed, and use of the vaccine in civilian medical practice in the near future, should provide authorities with additional information needed to evaluate fully the role of this new agent in preventive medicine and pharmacy.

INCIDENCE OF RESPIRATORY ILLS STUDIED

UPPER respiratory infections as an important cause of incapacitating manpower prompted Lt. W. H. Harris, Jr. (M. C.) U. S. N., to study the incidence of these diseases aboard a destroyer. (*Ann. Int. Med.*, 23:147, 1945). Outside contacts were apparently the most important factor in bringing about an outbreak of infections.

Without such contacts, upper respiratory infections tended to diminish to an extremely low level within two or three weeks. "This seems important," says Lt. Harris, "since if such can happen in a small 'community' (personnel of destroyer), it can possibly be brought about ashore in larger communities."

Long-continued fatigue, irregular dietary and bowel habits, impaired sanitation measures and exposure to rains, all seemed to be without effect in bringing about an increased incidence of infections in the absence of contacts.

Although no severe climatic changes were encountered, gradual changes of this nature apparently have little or no influence.

Since active infections fell to a minimum and remained low after the ship had been at sea for two weeks or so during its voyages, "carriers" among the ship's own personnel were apparently of no significance.

These observations, Lt. Harris concludes, confirm that control of this important group of diseases seems to lie in the control of "contacts."

THE NEXT STEP IN PHARMACY'S FIGHT AGAINST VD

by KENNETH R. MILLER*

AMERICAN SOCIAL HYGIENE ASSOCIATION

NEW LEAFLETS AND DISPLAY CARD MADE AVAILABLE TO PHARMACISTS AS A. PH. A.'S POSTWAR PROGRAM WITH SOCIAL HYGIENE ASSOCIATION IS PLANNED BY JOINT COMMITTEE

PHARMACY will continue to cooperate with other public health groups during the coming year in combating venereal disease by extending the program of the Joint Committee of the AMERICAN PHARMACEUTICAL ASSOCIATION and American Social Hygiene Association. From a small beginning five years ago, this cooperative project has grown until in 1945 more than 6000 pharmacists in 20 states used the Committee's special display cards and distributed the leaflet, "A Tip from Your Pharmacist."

In some communities a single pharmacist contacted the Committee; in others, the local or state pharmaceutical association aided the state health department or social hygiene society in working out distribution to every pharmacy in the state. It was a big job—well done.

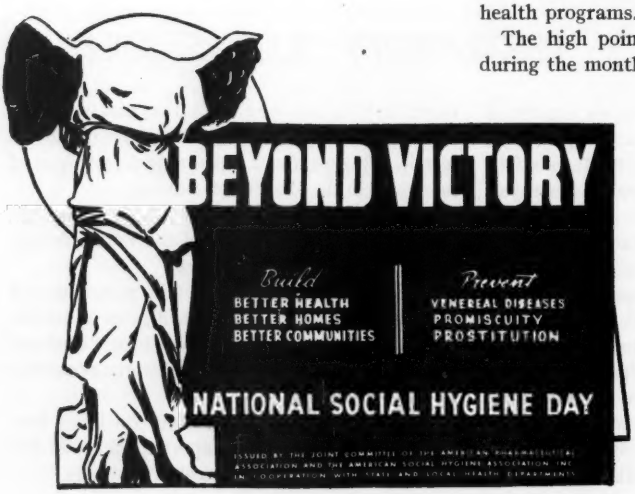
In the months ahead every American community must face the social hygiene education job again. This time we must do even better than in the past. For it is a well-known fact that the venereal diseases tend to spread even more rapidly *after* a war than during it.

It was relatively easy during the war to put extraordinary efforts into venereal disease control measures and gain public cooperation. Most persons recognized that the fighting and working ability of the armed forces and industrial personnel was dependent on it. Now we shall have to fight not only the diseases but the tendency to forget, to relax, to do things the easy way. Now is the time to combat the conditions which contribute to the spread of gonorrhea and syphilis: ignorance, sexual promiscuity and prostitution.

Hence the need for much greater numbers of pharmacists in the national venereal disease educational program. The joint program of the AMERICAN PHARMACEUTICAL ASSOCIATION and the American Social Hygiene Association has again illustrated the power and effectiveness of pharmacy participation in such health education. Pharmacists have participated not only because it is a natural function of the profession, but because it is a simple way to emphasize to their communities the role of pharmacy in public health programs.

The high point in the 1946 program will be during the month of February, with February 6

* Director, Public Information Service.



THE COUNTER CARD, illustrated at the left, is available to all pharmacists without charge. PAMPHLETS on venereal disease (see next page), supplied by A. Ph. A.'s joint committee, emphasize the pharmacist's role in this health work.

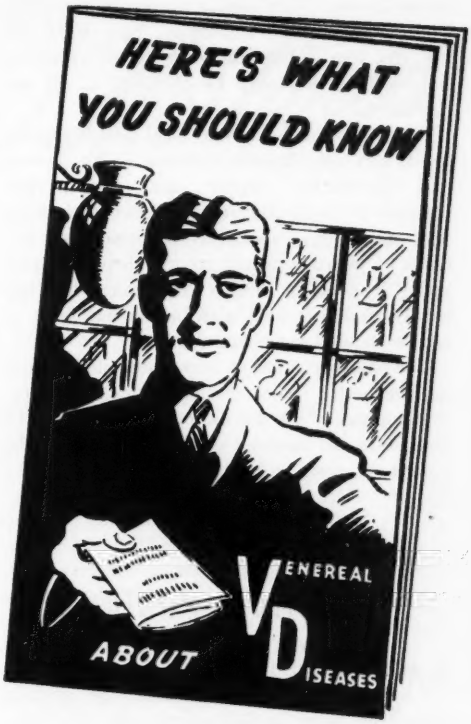
set aside as Social Hygiene Day, when pharmacy and other professional and lay groups make a coordinated effort to bring venereal disease information to the public.

A new display card in three colors, 14 by 11 inches in size, has been prepared by the A. PH. A. —A. S. H. A. committee as illustrated on page 10. We hope that every pharmacist will accept a copy of this counter card for use during February and at other times during the year. The card may also be used as a part of professional window displays. For your free copy send a postcard request to the Joint Committee of the AMERICAN PHARMACEUTICAL ASSOCIATION and American Social Hygiene Association, 1790 Broadway, New York 19, N. Y. "At cost" prices will be quoted for larger quantities.

For use in conjunction with the VD counter card, or separately, the Joint Committee has just prepared a new leaflet especially designed for distribution by pharmacists. Entitled "Here's What You Should Know About Venereal Disease," this publication will replace "A Tip from Your Pharmacist," of which nearly a million copies were distributed.

It contains up-to-the-minute facts on gonorrhea and syphilis, their treatment and prevention, printed as a six-page folder $3^1/_2$ by $5^1/_2$

(*Continued next page*)



----------CLIP THIS COUPON----------

Joint Committee of the American Pharmaceutical Association
and the American Social Hygiene Association
1790 Broadway, New York 19, N. Y.

I wish to participate in the educational campaign for controlling and preventing the venereal diseases. Please send me the material checked below:

☐ A special display card for my pharmacy without charge. ☐ Quote prices on an additional ____ counter cards.

☐ One hundred copies of the pharmacy leaflet, "Here's What You Should Know About Venereal Disease," without charge. ☐ I would also like ____ thousand leaflets at $5 per thousand.

☐ Material on VD control suitable for an address before a civic club.

Name _____

Street and Number _____

City and State _____

Amount Enclosed $_____ Date _____

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inches in size. Just send a request to the Joint Committee at 1790 Broadway, New York 19, for 100 free copies for counter distribution. Larger quantities may be obtained at $5 per thousand.

In many areas, state and local health departments and social hygiene societies are purchasing and distributing display cards and leaflets through a cooperative arrangement with local and state pharmaceutical organizations. Officers of pharmaceutical groups should contact social hygiene or health department officials locally to see if such distribution has been or can be planned in a particular area.

The pharmacist has an important role in building the better health, better homes and better communities which this nation needs. Join with your state and national associations to meet the important postwar health menace of venereal disease. Here are the ways you can participate:

1. Cooperate individually and through your professional organizations with municipal authorities whenever either legal or voluntary programs are proposed for controlling and preventing venereal diseases, prostitution and promiscuity.

2. Guide infected persons to competent medical treatment and discourage attempts at self-treatment at every opportunity. The Committee's leaflets are helpful in this regard.

3. Address lay groups in your community on social hygiene problems, or arrange to have a representative of the social hygiene society or health department in your area deliver such an address. Material and suggestions may be obtained from the A. PH. A.—A. S. H. A. committee at 1790 Broadway, New York 19.

4. Display the VD counter card designed especially for pharmacies.

5. Distribute the leaflet, "Here's What You Should Know About Venereal Disease."

EFFECTIVE ANTIDOTE FOUND FOR ARSENIC

MORE than 200 patients poisoned by arsenic in the course of treatment for syphilis have been saved in this country by 2,3-dithiopropanol, first developed by British scientists and made even more widely useful through research in this country, according to a report by Science Service.

There is hope that the same saving of lives may be accomplished in cases of mercury poisoning, such as occurs in use of bichloride of mercury in suicide attempts.

A closely guarded secret during the war, this alcohol has been known only as BAL (British anti-lewisite). Its identity is now revealed by the biochemist whose twenty or more years of painstaking research between two wars resulted in its development. This is Prof. R. A. Peters of Oxford University. His report in the English scientific publication, *Nature*, will be followed shortly by reports in this country of the work of American scientists during the war.

BAL, the anti-arsenic chemical, was developed for use in local decontamination of the skin after lewisite poisoning. Lewisite, war gas developed by an American scientist, is an arsenic-containing chemical.

When the British shared the secret of BAL with American military and scientific authorities, scientists in the United States first confirmed the British findings and then developed a practical ointment for use on the skin and in the eyes in case of lewisite poisoning. This was necessary because BAL itself is very unstable in aqueous solution.

The very specific nature of the alcohol's action on arsenic in the skin suggested that it might be useful in cases in which arsenic had reached other tissues in the body, for example, in patients suffering toxic reactions from arsenicals.

American scientists next devised an injection of the alcohol, using peanut oil and benzyl benzoate as the vehicle.

Ampuls of this form of BAL were distributed to all rapid treatment centers of the U. S. Public Health Service, where syphilis patients were getting large doses of arsenicals. From these centers, records of more than 200 cases treated with BAL show that it is effective in counteracting arsenic poisoning. Instances of failures were believed due to insufficient dosage or too late administration.

BAL's action is much more than that of an antidote. It actually removes the poison from the tissues by forming a compound with the arsenic which the body can excrete.

BAL itself is toxic but can be safely used by observing proper precautions regarding dosage. It has been distributed to physicians in this country for clinical investigation. Manufacture for civilian distribution is planned but the chemical may not be available for at least several months.

Amino Acid Mixtures

NEW PREPARATIONS THAT CAN REPLACE WHOLE PROTEIN FOOD IN NUTRITIONAL THERAPY ARE DISCUSSED BY AN AUTHORITY

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THE pharmaceutical profession has extended its frontiers greatly during the past few decades. One such advance has been the production and dispensing of many preparations for nutritional purposes. With recent progress in the science of nutrition, food is no longer taken for granted but is actually used as a specific therapeutic measure in the treatment of disease. The physician can no longer view with complacency malnutrition which frequently develops in patients unless specific measures are taken to prevent it.

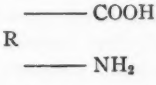
The purification of the many food substances has facilitated greatly nutritional therapy. It has even led to the preparation of solutions which permit injection of an almost complete diet in patients unable to eat. The most recent addition to the group of purified nutritional substances is the use of an amino acid mixture as a source of protein food.

Individual amino acids have also been recommended for specific therapeutic uses, but these studies are still so incomplete that no definite statement can be made as to their value. In this paper only mixtures of amino acids will be discussed, mixtures which may be used instead of whole protein food to prevent or correct protein deficiencies in various conditions in which whole protein food cannot or should not be employed.

General Considerations

Amino acids are to protein what glucose is to starch. In other words, they are the unit components of food and tissue protein. Their discovery, purification and identification mark one of the milestones in the development of the science of nutrition. The isolation from foods of these specific chemical components which enter into the metabolic activities of the body represents the most important recent contribution of chemistry to the field of nutrition.

Amino acids differ from vitamins in that they are more than catalysts or enzymes; they actually enter into the structure of body tissue. While they are thus used up like glucose, unlike the latter they are not burned as fuel unless calorigenic elements are absent, when they may act for glucose when the latter is not available. They are also unlike other purified food essentials because there so many of them. The glucose molecule represents the form in which carbohydrate is utilized; the vitamin B complex has been divided into a number of different crystalline substances. On the other hand, amino acids are twenty-one or more in number, each different, though conforming to the same general chemical formula in that they contain an amino group and a carboxyl group.



Consideration, therefore, of the amino acids as the structural units of food protein leads immediately to an enumeration of these various amino acids in Table 1. Most important is the fact that but ten of them may be considered as "essential." These essential amino acids are also termed indispensable in that the body is unable to manufacture them from other amino acids or from simpler material and that they must be supplied before normal protein metabolism

TABLE 1.—THE VARIOUS AMINO ACIDS IN PROTEIN

INDISPENSABLE	DISPENSABLE
Lysine	Aminoacetic acid
Tryptophan	Alanine
Histidine	Serine
Phenylalanine	Norleucine
Leucine	Aspartic acid
Isoleucine	Glutamic acid
Threonine	Hydroxyglutamic acid
Methionine	Proline
Valine	Hydroxyproline
Arginine	Tyrosine
	Cystine

can occur. For example, normal growth will take place if these essential amino acids are fed to growing rats as the sole source of protein in the diet. Yet if one of them is omitted, normal growth is not obtained. In this sense certain of the individual amino acids assume an importance comparable with the vitamins in maintaining normal nutrition and life processes. Much of the recent investigation regarding the nutritive significance of the amino acids has been carried out and described by W. C. Rose.[1]

Further consideration of amino acids reveals the fact that each protein in the body as well as each protein in food has its own individual amino acid composition (Table 2). Thus transfers from one protein to another may be conceived as requiring a breakdown of the protein molecule into its individual amino acids with the reassembling of them to form another protein.

This general procedure is the normal method by which food protein is transformed into tissue protein—hydrolysis or digestion occurs in the gastrointestinal tract; the resulting amino acids are absorbed into the portal system and the synthesis of these building stones then takes place in the liver and other tissues. It is probable that extra-alimentary transfers also require a similar mechanism as, for example, the use of tissue protein in the synthesis of new serum protein after its loss in a hemorrhage. Other types of interchange between protein molecules also occur as shown, for example, by the recent studies of Schoenheimer.[2]

The important conception to emphasize from these new studies on protein metabolism is one of dynamic rather than static equilibrium. In other words, protein is constantly undergoing rapid and perhaps profound changes of many kinds. The concept of great masses of inactive protein stores must be abandoned—all protein tissue is in a constant state of chemical activity.

By using amino acids instead of food protein the physician can administer protein nourishment in its simplest form just as he uses glucose. With parenteral administration he does not have to depend on digestion and absorption by the gastrointestinal tract. In this way protein starvation can be avoided even though these two functions are completely impaired. Even if the patient requires parenteral fluids, these need no longer be confined to salts or glucose; protein-building substances can now be just as easily supplied. Amino acids may also be administered orally for the maintenance of proper nutrition in certain special conditions, as will be described.

Sources of Amino Acids

Like chemically pure glucose and vitamins, amino acids are available in crystalline form and may be purchased as such. They may then be combined in the desired proportions and given to the patient either by mouth or by injection just as in the case of crystalline vitamins or glucose. The greatest drawback to this is the cost. The large amount of protein nourishment needed makes the use of crystalline amino acids unpractical at the present time, although it may be that in the future chemical methods will be devised whereby crystalline amino acids may be cheap enough to permit their general use.

Another objection to crystalline amino acids is the fact that, in preparing some of them, racemic mixtures are obtained containing both the natural and unnatural isomers, which are difficult to separate. All natural proteins contain only the natural isomers, although in the case of some amino acids the two forms are equally utilized. The suggestion of Albanese[3] that the unnatural form may in some cases be deleterious is an important consideration which needs further investigation.

By adequate digestion *in vitro* of natural proteins a mixture of amino acids may be easily obtained. These procedures are essentially similar to those by which the body produces amino acids from protein food in the gastrointestinal tract and are both practical and cheap.

Such methods of preparing amino acids involve the possibility of losing some of the essential ones during the procedure of digestion and purification. However, losses are dependent on technical details and moreover can be measured by testing the resultant digest both chemically and biologically for the presence of all the essen-

tial amino acids. Another disadvantage of using these protein hydrolysates as a source of amino acids is the possible generation or introduction of foreign or deleterious substances during manufacture. This difficulty can, apparently, be avoided by carefully conducted procedures.

A final possible criticism is the presence of peptides as well as amino acids in the final mixture. This objection appears to be of no practical significance. As long as digestion has been sufficient to remove all traces of true protein molecules, no danger seems to arise from the presence of peptides provided they are not too large. How large they may be is not really known. On the other hand, it may prove advantageous to provide some peptides rather than single amino acids in that one step in the process of building of body protein may be saved.

The several methods for producing amino acids by the digestion of protein may be classified in general into enzymatic and acid hydrolysis methods. Thus far the enzymatic procedure has been the more extensively used and has given very satisfactory results.

In a review on nitrogen balance I[4] have reported the successful results obtained with use of a protein digest[5] prepared by pancreatic hydrolysis of casein. This product contains the amino acids of casein and pancreatic tissue, two animal proteins of high biologic value. Although its content of essential amino acids is not accurately known, biologic tests have shown that it contains all in sufficient concentration to support growth in rats when given as the sole source of nitrogen.[6] This is one of the most rigid tests of the efficiency of protein.

Amino acid preparations produced by enzymatic hydrolysis contain approximately 70% of the potential amino acid nitrogen in the form of amino nitrogen (representing amino acids), most of the remainder being present as peptide nitrogen. In the case of acid hydrolysis more nearly 100% of the nitrogen can be obtained in the form of free amino acids, although it is known that the tryptophan is destroyed in the process of acid hydrolysis. This must be replaced in the products prepared by this method. It has now been demonstrated clinically that protein hydrolysates containing amino acids and peptides, when given in adequate amount, can maintain nitrogen balance effectively and cause regeneration of serum proteins.[6a]

Standards for Use of Amino Acids

Many preparations are available at the present time offering the advantages of amino acid mixtures for use as a substitute for whole protein food. The pharmacist is often at a loss to know whether these preparations can be used

TABLE 2.—ESSENTIAL AMINO ACID COMPOSITION OF VARIOUS PROTEINS

	Human Serum Globulin	Human Serum Albumin	Casein	Muscle	Egg White	Gelatin
Arginine	4.8*	6.1*	4.1	7.2	5.8	7.6
Cystine	2.0	3.8	0.3	1.1	2.3	0.1
Methionine	1.0*	1.2*	3.5	3.2	4.4	0.8
Isoleucine	?	2.0	6.5	3.4	?	1.7
Leucine	9.3*	11.9*	12.1	12.1	10.7	3.7
Lysine	0.7*	5.8*	6.9	7.6	6.5	4.3
Histidine	2.5*	3.5*	2.5	2.1	1.8	1.0
Phenylalanine	5.9	7.8	5.2	4.5	5.5	2.0
Threonine	8.3*	5.0*	3.9	5.3	3.6	1.5
Tryptophan	2.8*	0.19*	1.8	1.2	1.5	0.0
Valine	?	4.1	7.0	3.4	6.8	2.5
Total	43.4±	51.4	53.8	51.1	48.9+	25.2

These figures were obtained from Block and Bolling ("The Amino Acid Composition of Proteins and Foods," Springfield, Ill., Charles C. Thomas, Publisher, 1945) with the exception of those marked with an asterisk (*), which represent data obtained by the analysis of gamma globulin and crystalline albumin by Brand, Kassell and Saidel, (*J. Clin. Investigation*, 23: 437, 1944). They represent grams per hundred grams of the dry protein on the basis of 16% nitrogen.

Note how deficient gelatin is. Note also that serum albumin is deficient in tryptophan and low in isoleucine. A deficiency of isoleucine in human plasma protein has been shown by Hegested, McKibbin and Stare in growth experiments (*J. Clin. Investigation*, 23: 705, 1944).

with benefit. Most of them are offered for oral consumption. Entirely apart from their palatability it is obvious that the biological value of such products must be established before they are used for this purpose. Rigid tests should be carried out.

First of all the ability of such preparations to maintain nitrogen balance in the human when supplied as the sole source of nitrogenous nourishment must be counted as a minimum requirement. This means that humans be put on a diet in which the amino acid preparation is the only source of protein. All urine and feces are collected during this period and the nitrogen content estimated. If the patient is in nitrogen balance he excretes less than he ingests during at least three-day or four-day periods. From this it may be assumed that the amino acids are retained and used for the synthesis of tissue protein.

In addition to the achievement of nitrogen balance, evidence should also be available that these products lead to regeneration of serum protein in depleted animals and humans.

A third and still more rigid requirement, and one that is perhaps easiest to carry out, is the ability of such preparations to support normal growth in immature rats when given as the sole source of protein food.

Before accepting products for either oral or parenteral use the pharmacist should be certain that these requirements have been met. The pharmacist must insist upon maintaining nutritional standards for amino acid mixtures and protein hydrolysates just as he does for other preparations. Only in this way can we expect the patient to assimilate and utilize such substances fully.

General Indications

Amino acid mixtures are at the present time available only as protein hydrolysates. They have specific indications and cannot be used as a panacea for all nutritional ills or for all symptoms referable to the gastrointestinal tract. For example, the problem of the malnourished patient who will not eat is not always a simple one and the physician must not expect miracles from amino acids alone, any more than he can always expect dramatic results from vitamin preparations alone. Amino acid mixtures form but one, though important, element of the diet and their use will lead to definitely beneficial effects provided they are used when properly indicated and in conjunction with other nutritional requirements.

Whenever there is a failure in normal ingestion, digestion and absorption of food protein, inevitable deficiencies in protein begin to develop at once unless protein is supplied in some other way. The proper use of amino acids provides a practical method of preventing protein starvation. Any patient who does not eat will develop a protein deficiency; any patient who eats but does not digest or absorb his food will likewise suffer protein starvation. He may, of course, suffer deficiencies in other elements, water and salts, for example.

Just as the universal use of solutions of glucose and saline obviates many of these deficiencies, the wider use of amino acids will prevent deficiencies in protein, which may be just as important as preventing deficiencies of water, electrolyte and vitamins. As far as parenteral administration is concerned, it may be stated as a general proposition that, when solutions of saline or glucose are injected for maintenance of daily needs, amino acids are indicated as well.

Protein deficiencies are actually of frequent occurrence in clinical medicine, yet they are seldom recognized because physicians are apt to view an inadequate protein intake with complacency. While the importance of supplying glucose and vitamins, water and salts has been recognized, other food (*e. g.*, protein) has been looked upon as being dispensable. We have been lulled into a false sense of security by the supposition that there are large stores of reserve body protein and that the absence of protein intake may result in little or no difficulty.

The fallacy of this view is indicated in a recent review[6b] and in other papers in which the various clinical manifestations of protein deficiency have been described. Of these, a decrease in the level of plasma proteins (hypoproteinemia) is of great importance. However, it may be emphasized that hypoproteinemia, while not always found, is one of the objective evidences of protein deficiency, particularly when there is a fall in the albumin fraction. Though often masked by dehydration and an increase in the globulin fraction, a fall in plasma proteins has been observed frequently, especially after operation. Indeed, hypoproteinemia has now been demonstrated to be frequent in both medical and surgical wards of any hospital.

Specific Indications for Clinical Use

A. Patients unable to ingest protein because of severe gastrointestinal disease or persistent vomiting from any other cause: In these cases amino acids must obviously be given parenterally. They

include such conditions as intestinal obstruction, local or general peritonitis, acute cholecystitis and a severe peptic ulcer in which the ingestion of any food provokes severe pain or vomiting. Important in this group are cases of chronic disease such as gastrointestinal carcinoma, in which operation is contemplated in the presence of severe malnutrition which cannot be corrected by a high protein diet. The preoperative preparation in such cases with parenteral protein will lower mortality, facilitate surgery and reduce complications. To be included in this group also are postoperative cases in which abdominal operations have been performed and in which nothing by mouth is permitted in order to achieve gastrointestinal rest so that healing may occur. In such cases, too, protein starvation will obviously occur unless nourishment is given parenterally.

Many manifestations of protein starvation can thus be avoided and the clinical condition be so improved thereby that a full diet by mouth can be started much earlier than when the parenteral injections are limited to water, salts and glucose.

Patients suffering from advanced inanition must also be included in this group. Amino acid therapy recently has been shown capable of saving many lives from the late, or what might be called the hitherto irreversible, stage of starvation.

In the present war thousands, perhaps millions, have died because of inanition. Many died even when food was made available to them; for it has been known for a long time that after a certain point in progressive starvation a fatal outcome cannot be avoided because the gastrointestinal tract becomes incapable of function. Fluid or food cannot be swallowed or, if given by tube, is vomited or provokes diarrhea.

In the recent (1943) famine in India, Krishnan and his co-workers[66] showed for the first time that the intravenous injection of a solution containing hydrolyzed protein and glucose reduced considerably the mortality in these late cases. Injections of glucose alone, of saline solution, plasma or blood proved relatively ineffective. Only a few injections, averaging three, of the hydrolyzed protein solution were necessary. After this treatment patients were revived and able to start taking food and fluid by mouth. These investigators reported 5000 injections with few untoward reactions, none of them serious. Their hydrolysate was a papain digest of pork.

B. Patients able to ingest protein but in whom the amount is inadequate or difficulty is encountered in digestion or absorption: In this group of cases amino acids may sometimes be given orally, but in many they will have to be given parenterally. This group includes a wide variety of diseases, particularly those in which severe malnutrition has developed because of the patient's inability to take sufficient food. After a certain period of malnutrition, the gastrointestinal tract becomes incapable of digesting a sufficient amount of protein food (especially if edema of the gastrointestinal tract is present) and vomiting or diarrhea may result.

Sparing digestion by giving amino acids orally will sometimes obviate the difficulty, as reported by Olmsted,[7] but in many cases the oral intake of food will have to be supplanted or supplemented for a time by intravenous administration in order to assure a sufficient intake. This is true of those with extreme malnutrition, as just described, but is not infrequently seen after severe injuries and extensive thermal burns.

In other cases digestion or absorption is impaired because of severe gastroenteritis, ulcerative colitis or regional ileitis, so that food by mouth provokes severe diarrhea and thus digestion and absorption are prevented. In such a case also the substitution of amino acids for whole protein by mouth may, by sparing the necessity for digestion, result in adequate absorption, although in many cases it will be advisable to put the gastrointestinal tract completely at rest by giving nourishment parenterally. To be included in this group are certain types of intestinal fistulas in which profuse discharge of undigested contents escape.

C. Other indications including patients with allergy and intractable and especially bleeding peptic ulcer: In cases of extensive protein allergy the use of amino acids instead of whole protein will frequently avoid this difficulty and they have been used as such by a number of observers, especially in infants, with very favorable results.[8] Olmsted[7] has used amino acids also during the diagnostic period in severe food allergy, thus avoiding the usual starvation which otherwise occurs.

In peptic ulcer the use of amino acid mixtures orally has proved effective on purely clinical grounds with evidence of healing, as shown by x-ray examination in a series of peptic ulcers previously refractory to medical therapy as reported by Co Tui.[9] In a series of bleeding peptic ulcers a similar regimen of oral amino acids has been shown by Levy[10] to result in a much more rapid recovery than in cases in which the ordinary regimen of whole protein food has been employed. This may be due to the fact

that the administration of amino acids not only permits protein nourishment without the need for digestion but has an additional advantage in that amino acids act as a buffer and thus tend to neutralize gastric acidity, as shown by Levy and Siler.[11]

Oral Use of Amino Acids

The use of amino acids by mouth is therapeutically desirable in that it avoids the necessity of protein digestion. Thus it would seem that larger amounts of protein nourishment could be administered in this way and more rapid correction of protein deficiencies in extremely malnourished patients achieved.

While clinical experience is not extensive, it has been my[12] observation that, in many of these patients in whom the ingestion of protein food provokes diarrhea or even vomiting, the substitution of amino acids permits absorption without difficulty. This would seem to be especially true of jejunal feeding; for example, Mulholland and his associates[13] have administered oral amino acids very soon after gastric resection through a jejunal tube passed across the stomach at the time of operation. They have succeeded in administering a 3000-calorie, 200-Gm. protein diet in this way with striking improvement in postoperative asthenia and rapidity of convalescence.

Amino acids dissolved in water, milk or juices may be taken by mouth. However, the taste of some of the commercial preparations available at present is unpleasant. Attempts have been made to flavor the solution but these have not been entirely successful, although the taste can be partially disguised in a number of ways.

One method, which has been employed by Co Tui, is to stir 20 Gm. of the powdered protein hydrolysate in a small amount of water and ask the patient to follow it up with 20 Gm. of a sugar solution as a chaser. This is done ten to fifteen times a day and thus permits the ingestion of 200 to 300 Gm. of protein substance in the form of amino acids in twenty-four hours.

The unpleasant taste of some amino acid preparations may be avoided by the use of tube feeding. Twenty grams each of a protein hydrolysate and simple carbohydrate in about 200 cc. of water may be administered ten or fifteen times a day during day and night if desired, thus permitting the large intake of 200 to 300 Gm. of protein nourishment along with the same amount of carbohydrate.

While amino acids and glucose alone are the simplest formula for oral feeding, a more complete diet may easily be administered by adding fat according to the technic devised by Olmsted.[7] Olive oil is emulsified with the aid of gelatin, and the amino acids and carbohydrates are then added. Olmsted has been able to administer large amounts of food through a gastric tube in cases of severe malnutrition and start the patient on the road to nutritional recovery much more effectively and rapidly than is possible through persuasion or other methods using protein foods.

It should be mentioned, of course, that vitamin mixtures must be added to the amino acids fed by mouth. Any of the preparations on the market may be used, particularly those that are available in liquid form. An adequate amount is simply added to the mixture given by tube.

Parenteral Administration

The parenteral administration of protein food by means of amino acids represents as great an advance in therapy as the injection of glucose as a means of supplying calories or of water and electrolyte in maintaining water balance and in correcting dehydration, or as the injection of crystalline vitamins in combating vitamin deficiencies.

Indeed, the addition of amino acids to the usual parenteral fluids makes possible the administration of an almost complete diet without recourse to the usual digestive processes. Starvation can be avoided almost completely even though the patient is unable to take anything by mouth. Complete rest of the gastrointestinal tract, which heretofore inevitably resulted in protein starvation, can now be achieved with an almost full dietary intake. Thus both food and rest can be utilized; both factors are obviously very important in the healing of many types of lesions both surgical and medical. To limit the parenteral diet to water, electrolyte, glucose and vitamins is no longer justified; the addition of amino acids makes the mixture more nearly complete. A program for such feeding is shown in Table 3.

Methods of Parenteral Administration.—Preparations of hydrolyzed protein are available as sterile solutions ready for intravenous injection or in the form of a powder which with appropriate care and facilities can be made into a solution for intravenous use.

The mixture which I recommend is one containing 5% protein hydrolysate, 5% glucose and 0.2% sodium chloride. A liter of such a solution provides four of the necessary nutritional elements: water, salt, carbohydrate and protein.

It should be emphasized, of course, that the

biologic value of any amino acid mixture or preparation of hydrolyzed protein depends on its content of essential amino acids, and this in turn depends on the proteins selected for hydrolysis as well as the details of the procedure itself. It is therefore important for the pharmacist to be sure that any solution he dispenses has been sufficiently tested to demonstrate that it contains a sufficient concentration of all the essential amino acids to maintain normal protein metabolism.

TABLE 3.—PROGRAM FOR DAILY PARENTERAL FEEDING (INCLUDING AMINO ACIDS).*

Initially larger doses and plasma or whole blood transfusions may be required to meet acute deficits.

	Solutions Required	Actual Amount of Nutriments				
		H_2O, Cc.	Salt, Gm.	Glucose, Gm.	Protein as Amino Acids, Gm.	Calories
A. No protein depletion	Protein hydrolysate 5%-glucose 5%, 1 liter; glucose 5%, 1 liter; isotonic solution of sodium chloride,† 1 liter	3000	11	100	50	600
B. Moderate protein depletion	Protein hydrolysate 5%-glucose 5%, 2 liters; isotonic solution of sodium chloride,† 1 liter	3000	13	100	100	800
C. Severe protein depletion	Protein hydrolysate 5%-glucose 5%, 3 liters	3000	6	150	150	1200

* Vitamins are given separately. In certain surgical patients vitamin C is especially indicated in doses of 1 Gm per day.

† After severe operations it may be inadvisable to inject saline solution in view of the evidence indicating the existence of a postoperative intolerance to salt (Coller, F. A., and others, *Ann. Surg.*, 119, 533, 1944). In such cases 5% glucose in water is substituted for the isotonic solution of sodium chloride.

The rate of injection of hydrolyzed protein cannot be too great lest symptoms of nausea and vomiting be produced. This rate is somewhat slower than that usually given for glucose solutions alone; *e. g.*, for 1 L. containing 5% protein digest and 5% glucose a two-hour period is usually required in an average sized adult. Great individual variations are observed and it is often permissible to let the patient adjust the rate of flow himself.

In many cases a liter will run in during one and one-half hours with no unpleasant subjective symptoms; in others such a rate will provoke nausea, a feeling of warmth and occasional slight abdominal pain or perhaps other unpleasant symptoms. A two-hour period is really required for full utilization of the injected glucose and amino acids; a more rapid rate may permit loss of either in the urine, though the amount is not very great even with a one-hour injection.

Injections are best given a liter at a time, one in the morning and one in the afternoon. If the injection supplements food by mouth it should be given in the evening or after the last meal so as not to interfere with the eating of food.

Deleterious Effects—The preparation of intravenous solutions has a special interest for the pharmaceutical profession because many of the details in regard to the preparation of safe sterile solutions for injection into the circulation have been worked out by pharmacists. Moreover, pharmacists in many hospitals are charged with the responsibility of preparing such solutions.

No intravenous injection can be given with impunity; the possible dangers have been sufficiently emphasized by many and great care must always be exercised regardless of the solutions given. The pharmacist must remember, however, that a solution of amino acids is an excellent culture medium and particular care must be taken to prevent contamination. In this sense it is similar to whole blood and plasma except that bacterial growth is much more apt to occur in amino acid solutions. Pyrogenic reactions may be produced by such contamination.

Even with utmost care and elimination of bacterial growth, solutions of amino acids are

potentially as capable of provoking reactions when given intravenously as plasma or whole blood transfusions, although at the Barnes Hospital they have been less frequent than those experienced with plasma or whole blood when given with the same type of tubing and with the same care. Careful scrutiny was made of all injections during the past eight months. Of 2406 liters injected intravenously during this time there were 22 reactions. None was serious. In 12 of them previous and subsequent injections were given without incident.

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CIVIL SERVICE PHARMACY STANDARD TOO LOW

OBJECTIONS of the AMERICAN PHARMACEUTICAL ASSOCIATION to the U. S. Civil Service Commission's ruling that persons who could not qualify for licensure in 45 of the 48 states are eligible for government pharmacy positions has been supported by college deans, associations and other pharmacy officials throughout the country. Calling the Commission's stand "inimical to public interest and prejudicial to the professional standing of pharmacy," the joint A. PH. A.–N. A. R. D. conference also registered official opposition.

In a letter to the A. PH. A. secretary, replying to the profession's contention, Harry B. Mitchell, Commission president, cited the Veterans' Preference Act which provides that no minimum education will be prescribed for professional positions except when the Commission decides that the duties cannot be performed by a person who does not have such education.

Mr. Mitchell drew the conclusion that it would be "entirely inconsistent . . . to attempt to justify the writing of minimum requirements" for the position of pharmacist since he was "reliably informed" that "at least more than half of the pharmacists in the United States" do not hold a four-year degree. The Commission insists that its own examination will assure that unqualified persons are not appointed as government pharmacists.

Answering the U. S. Civil Service Commission, A. PH. A.'s secretary, Dr. Fischelis, pointed out that there is nothing in the law to require the Commission to set its requirements at the lowest level of training or fitness in the field. The A. PH. A. is certain, said Dr. Fischelis, that no competent group within the profession "was consulted by the Commission in arriving at its apparent conclusion that pharmacy is not in a class with nursing, dietetics, elementary school teaching and agronomy, either scientifically, technically, or professionally."

The Commission was respectfully requested to make available the findings of fact which led to exclusion of pharmacy from the positions for which formal education requirements are prescribed and which resulted in the inclusion of the other occupations mentioned.

The A. PH. A. pointed out that at least 80% of the practicing pharmacists are college graduates holding the accepted degree of their day. Although recognizing that there was a gradual evolution to the four-year educational standard, it was explained that this parallels the development of education in other professions for which minimum standards were prescribed by the Commission for eligibility to the qualifying examinations.

After reviewing other information concerning the Commission's policy, Dr. Fischelis concluded that the Commission "is neither meeting the spirit of the Veterans' Preference Act nor acting in the best interest of the people of the United States who must obtain their pharmaceutical service from government pharmacies."

Copies of the A. PH. A.'s exchange of views with the Commission have been sent to all Congressmen, who also have had the situation called to their attention by many local and state pharmaceutical groups.

TEMPLE STUDENTS VISIT A. PH. A. AS WINNERS OF DISPLAY CONTEST

William Spring and Leonard Russock, winners of a Pharmacy Week window display contest held at Temple University School of Pharmacy, were awarded a trip to Washington to visit the AMERICAN INSTITUTE OF PHARMACY.

The students, both seniors and both sons of pharmacists, are shown in the photograph being welcomed by President George A. Moulton at AMERICAN PHARMACEUTICAL ASSOCIATION headquarters.

After visiting the laboratory, museum, library, publication offices and other facilities at the INSTITUTE, and discussing professional activities with staff members, Mr. Spring and Mr. Russock attended one of the sessions of the A. PH. A. Council.

Winners of the Washington trip were guests of Wyeth, Inc., which had supplied students with reproductions of the Wyeth painting, "William Procter—Father of American Pharmacy" to serve as the theme of the display contest. The competition was supervised by John A. Lynch, instructor in commercial pharmacy and display at Temple.

Students receiving honorable mention were Martin Schwartz and Mary Forgach.

WINNERS of the Pharmacy Week window display contest at Temple School of Pharmacy are welcomed at A. Ph. A. headquarters beneath the memorial statue of William Procter, Jr. Shown left to right are Leonard Russock, a senior student; John A. Lynch, instructor in display; William W. Spring, also a senior; and Dr. George A. Moulton, A. Ph. A. president.

PHARMACISTS WILL PUBLISH DIGEST OF LITERATURE FOR PHYSICIANS

To extend its professional relations program, the Barnes-Hind Pharmacy of San Francisco has established a publication, *Medical Briefs*, which will digest recent papers on the use of pharmaceuticals in therapy for use by physicians.

The project is an outgrowth of a consistent advertising program to the medical profession, always with an appeal based on summaries of medical literature pertaining to the product advertised.

"Talking the physician's own language, helping him by making the pertinent facts conveniently available, seems to us," says Robert L. Emerson of the Barnes-Hind Pharmacy, "to be the most sensible and effective way of promoting pharmaceuticals and the pharmacist's services."

Carrying their idea a step further, the pharmacists selected a publisher to work with their printer in developing an editorial and art format for a 16-page professional publication. Reprints and abstracts from leading medical journals will be published, by permission, with advertising appearing on the covers. To maintain the professional atmosphere of the publication it is not planned to illustrate the advertisements.

Barnes-Hind will invite pharmacists of other cities to co-sponsor the publication on an exclusive territory basis. Each pharmacist will have his own advertising in the copies to be used in his own community.

COUNCIL MEMBER HEADS GROUP FOR WAR NURSES MEMORIAL

Dr. H. A. B. Dunning, manufacturing pharmacist of Baltimore and a member of the A. PH. A. Council, has been named chairman of the executive committee of the Memorial Fund Committee to establish a memorial building in Washington for America's war nurses of World War II.

A campaign has been launched to raise a minimum of $2,000,000 to construct and endow the memorial.

HIGHLIGHTS OF 1945 ACHIEVEMENTS IN

ATOMIC power exploded into Victory during 1945 and the world recoiled in fear, as the consequences of any future misuse of this source of energy were recognized. Scientists pushed ahead in new fields of research but it was evident that social, economic and political progress lagged far behind scientific and technological advances.

At year's end pharmacy had turned to meet postwar problems with an enviable wartime record established in both civilian and military practice. Pharmacists were returning from the armed forces to find new drugs on prescription shelves, increased emphasis on preventive medicine and changing public concepts of adequate medical care. A new regulation of the Food and Drug Administration became effective which promised to bring many changes in the labeling and dispensing of drugs.

For members of the AMERICAN PHARMACEUTICAL ASSOCIATION, 1945 marked an expansion of their professional program under the guidance of a new secretary, with membership at an all-time high. Two especially important studies were undertaken: one on the regulation of the distribution of barbiturates, the other on pharmaceutical services in the U. S. Public Health Service.

Extensive revision work on U. S. P. XIII and N. F. VIII neared completion, as pharmaceutical laboratories readied still newer drugs for distribution. Streptomycin and influenza vaccine, for example, were scheduled to take their place alongside penicillin and DDT, two history-making products which had become generally available during the year.

Although many recent research achievements remained unpublished due to security restrictions until the end of the war, even the available reports indicated remarkable advances. The highlights of 1945 in medicine and pharmacy, and in several other scientific fields of special interest, are summarized on following pages from Science Service reports and in part from the JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

MEDICINE AND PHARMACY

Streptomycin, which proved effective in controlling tuberculosis in guinea pigs, was given to 34 human patients with a limited suppressive effect; recovery from typhoid in 3 of 5 cases suggested that the drug may bring recoveries and prevent carriers; streptomycin also checked the growth of Friedländer's bacilli and Klebsiella and other bacteria in laboratory experiments.

An operation for saving the lives of "blue babies" born with certain types of heart defects by joining a branch of the aorta and one of the pulmonary arteries to increase the flow of blood through the veins was devised and successfully performed on many patients.

Identity of BAL (British anti-lewisite) was announced as 2,3-dithiopropanol with reports that this alcohol, developed for local use as a skin decontaminant in protection against the war gas, had been found to be an effective remedy for arsenic and possibly mercury poisoning.

Vaccination of all U. S. Army personnel for protection against influenza was ordered.

Penicillin made 25 of 39 babies with congenital syphilis well, brought speedy recovery from trench mouth, and brought improvement for patients with brain and nervous system syphilis.

Muscular dystrophy remedy may come from a new chemical made from the two vitamins, tocopherol and inositol, it was reported.

The virus of horse "sleeping sickness" was isolated from chicken mites.

A new chemical agent, gamma-(*p*-arsenosophenyl)-butyric acid, for use against African sleeping sickness, was reported to give speedy cure of early cases.

Vaccine against dengue, or "break-bone fever," may result from first success in mouse passage and consequent attenuation of the virus.

A new weapon against malaria was developed, consisting of a portable plant for extracting, at low cost, quinine and other anti-malaria drugs from the bark of cinchona trees in the remote spots where they grow.

Influenza viruses cultured on two different kinds of living tissue, chick embryo and mouse lung, were shown to be chemically and physically identical.

Artificial eyes made of plastic instead of glass were developed by Army and Navy dental officers; the plastic eyes resemble natural eyes more closely than do glass ones and are more comfortable to wear.

Riddle of what causes one kind of heart disease, acute interstitial myocarditis of unknown etiology, may be on the way to solution with the discovery of the substance, apparently a virus, that causes a similar ailment in apes and smaller animals.

Evidence was found that infectious hepatitis spreads through contaminated drinking water; this is the first satisfactory evidence that a virus disease can be naturally acquired by humans through water. Gamma globulin, immune substance from blood, gives protection against it.

IN PHARMACY AND RELATED FIELDS

Heparin, anti-blood clotting chemical, may become means of preventing gangrene and loss of limb after frostbite, extensive studies indicate.

A skin graft operation on a hemophiliac was performed successfully for the first time; an active thrombin preparation applied to the place from which the skin graft was taken apparently was responsible for saving the patient from bleeding to death from this wound.

Sensitivity to the Rh blood factor may last for lifetime, investigations showed; a blood bank to save the lives of mothers and babies threatened because of a difference between the mothers' and fathers' blood was announced; the Rh factor was found to be absent in chimpanzees.

From 10,000 to 15,000 blind persons may have a chance to see again as the result of the formation of an eye bank to collect and make available human corneas for grafting.

Persons whose eye lenses have been removed in cataract operations can see ultraviolet radiations invisible to normal eyes, it was discovered.

Severe poisoning from breathing the fumes of carbon tetrachloride was successfully treated with methionine, one of the essential amino acids.

A new remedy and preventive for athlete's foot was found in undecylenic acid, a fatty acid found in sweat.

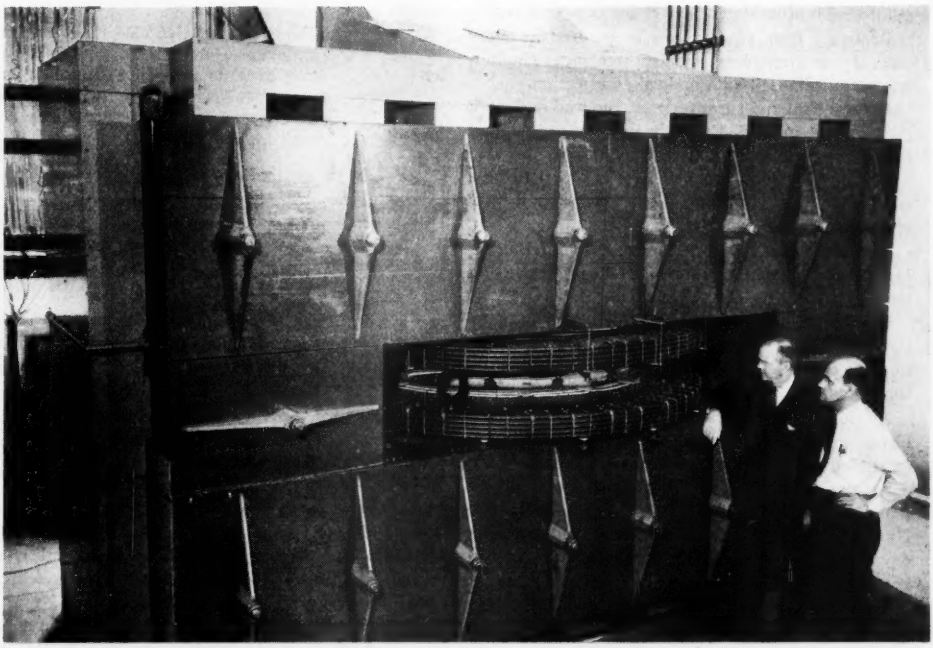
A simple method recently developed as an aid in the diagnosis of cancer of the uterus has been found helpful also in the diagnosis of cancer of the kidneys, bladder and other organs of the genitourinary tract.

Experiments demonstrated for the first time that there is a definite link between the kidney and ovarian functions.

Hearts were successfully transplanted in warm-blooded animals for the first time.

A new approach to conquest of venereal disease by mass testing plus penicillin treatment was pioneered in Birmingham, Ala., where new state law required blood tests and treatment, when necessary, for all citizens between 14 and 50 years, although 260,216 came voluntarily for testing as result of high-pressure publicity program.

Syphilis and tuberculosis case finding were combined for the first time in a 45-day campaign in Savannah, Ga.



HUNDRED MILLION VOLT X-RAYS are produced by this betatron. Hitherto war-secret details, revealed by General Electric laboratories, indicate that the same high-voltage electron stream that produces X-rays can produce other interesting forms of radiation, such as were formerly available only in cosmic rays. Possible adaptation to improve therapy of deep-seated cancer was foreseen.

Actin was announced as a previously undiscovered protein which plays a part in muscle contraction.

The dentist's drill may be replaced by a new device which operates on the sand-blast principle; it is painless, swift and silent, it was announced.

Penicillin was put on the market for general civilian use on March 15.

New ways to give penicillin include: by mouth, using sodium citrate as a buffer against stomach acid; mist inhalations; mixing with special gelatin and chemical to reduce number of injections needed; injections into artery for severe infections of arms and legs; in lozenges; in gelatin capsules; more effective penicillin treatment may result from a new substance in which it is combined with albumin of human blood.

The cause of toothache at high altitudes, studies indicate, is a disturbance of circulation in the pulp of the tooth which prevents equalization of pressures during change in altitude.

Thiouracil, a chemical which suppresses the thyroid gland hormone, helped 7 out of 10 patients with angina pectoris, it was reported.

Possible substitute for a scarce heart disease medicine, fogarine, has been found in a chemical from an Argentine tree.

Discovery of a new vitamin A, twin to the one already known, was announced.

A chemical from mushrooms, tyrosinase, was studied as a promising cure for itch of poison ivy.

Recovery from cholera can be assured in every case, it was announced, by new treatment combining sulfadiazine, plasma and saline injection.

Absenteeism and turnover were reduced and work performance improved when a vitamin supplement was given workers in an aircraft plant.

The mold source of penicillin was found to be a good source of vitamin D_2 when irradiated with ultraviolet.

An antianemia vitamin factor, vitamin B_c conjugate, was isolated in a new, pure form for the first time.

One of the new B vitamins, folic acid, was reported to have some anti-cancer activity; spontaneous cancers in mice disappeared in the laboratory tests.

All the family's bills for sickness, injury and childbirth can now be paid for $6 a month under a new expanded medical care plan launched in New York.

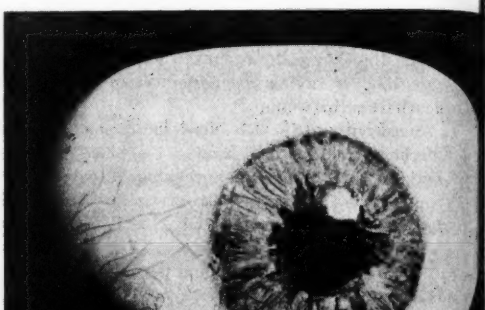
At the request of the Surgeon General of the Army, the National Academy of Sciences and the National Research Council created a committee for developing the best possible artificial limbs for war veterans.

Some strains of influenza virus can act like a poison, damaging the liver and other organs, as well as causing influenza, studies indicated.

Blackout of eyesight in aviators during sharp turns or dive pull-outs at high speeds is due to a temporary anemia in the eyeballs themselves; it can be prevented by suction applied to the eyeballs by wearing special goggles during flights

Eyes need protection against longer wave lengths of ultraviolet light than was previously supposed; damage to sight may occur without obvious signs of eye injury, studies indicate.

Histoplasmosis, previously considered rare and always fatal disease, is apparently widespread in mild form and may be mistaken for healed tuberculosis, X-ray pictures in a tuberculosis survey indicated.



THE UNSEEING EYE—Plastic artificial eyes (above) were developed by Army dentists, providing several advantages over glass eyes. Skillful tinting and anatomical construction partly account for the natural appearance. Exact fitting makes possible considerable movement in the socket. Plastic eyes are lighter, more comfortable, less expensive and more durable than artificial eyes heretofore available.

Records for recovery from extensive burns were apparently broken when a Marine who had 83% of his body burned was able to return to duty within three months.

Cancer research progress was given new impetus by $4,000,000 grant to establish Sloan-Kettering Institute for Cancer Research at Memorial Hospital, New York City, and by expansion of research program by American Cancer Society.

Pain, tenderness and wasting of muscles in some cases of rheumatoid arthritis was apparently explained by finding inflammatory nodules widely distributed in the skeletal muscles and the peripheral nerve trunks.

Encouraging results with neostigmine in paraly-

sis, rheumatoid arthritis and crippling from injury or infection were reported.

A new anti-bleeding material prepared from blood plasma and human placentas was announced; extensive studies are necessary before it can be tried on patients with hemophilia.

A study of first, second and third children born per family showed that the unusually large number of births in the United States during the war years, 1941–1944, does not mean more children per family. These years were mainly the starting point for families which had been postponed by the depression and of others which would have been started in later years if there had been no war.

THE ALL-SEEING EYE—Astounding details of radar's power to extend man's vision were revealed as the war ended. Development of microwave radar revolutionized techniques and made obsolete nearly all of the longer-wave types. The radar scope photograph of New York City (below) was taken with new high definition apparatus designed for use against Japan. The outline of Manhattan clearly shows the Hudson River with its shipping docks and other landmarks.

A study of all families in Indianapolis showed that Protestant couples have $^{6}/_{7}$ as many children as Catholic couples, while Jewish couples and mixed Protestant-Catholic couples have about $^{9}/_{10}$ as many as Protestant couples; the larger size of Catholic than Protestant families is especially noticeable in the upper income and educational classes; among the poorer people with little schooling, Protestant families average as large as, or larger, than those of Catholics.

A systematic study of the prenatal stages of human behavior demonstrated a continuity in the patterning of behavior in embryo, fetus, fetal infant and neonate.

Greater production of antibacterial chemicals such as penicillin may come from neutron bombardment of mold spores, it was announced.

Discovery of a change in blood clotting caused by penicillin, pointing both to possible danger and possible further benefits from the mold chemical, was announced.

The Nobel prize in physiology and medicine for 1945 was awarded to Sir Alexander Fleming, discoverer of penicillin, and Sir Howard W. Florey and Dr. Ernst B. Chain, who fathered its development into a life-saving drug.

An Institute of Forensic Medicine, first of its kind in the world, will be established at New York University College of Medicine, it was announced.

The Red Cross will continue to operate for civilians, in cooperation with an approved sponsoring health or medical agency, the blood donor service which has been so successful in supplying blood, plasma and albumin to the armed forces, it was announced.

The chemical structure of streptomycin was almost completely worked out.

New devices to help deaf people learn to talk and use the telephone and enjoy radio by seeing sound patterns for speech and music were developed.

Better treatment of cirrhosis of the liver may possibly come through use of a new medicine, thiouracil, it was announced.

An easy-to-use high-speed camera with self-contained light source was developed for taking pictures of surgical operations.

The uterine principle isolated from *Viburnum prunifolium* was found to be identical with the glucoside, salicin.

A commercial diene-alcohol, hexadienol, was recommended for supplanting pilocarpine and other general parasympathetic stimulants as a sudorific and as a diagnostic agent in localizing anhydrotic areas in the skin.

Experiments revealed new information on the nature and prevention of pyrogens, fever-producing substances which may contaminate pharmaceuticals.

Possible therapeutic uses for the corpuscular residue left after processing human blood to secure plasma were suggested.

A new technique for the treatment of burns was reported, employing a combination of gelatin and sulfonamides.

Three series of aliphatic derivatives of mercury were investigated for possible improvements in mercurial antiseptics.

The following discoveries in antibacterial investigations were also reported: dicumarol, antiblood-clotting substance, has antibacterial activity as well; material obtained from a strain of the fungus, *Aspergillus fumigatus*, checked *M. tuberculosis* in test tubes; a mold from human hair stopped ty-

phoid and dysentery bacteria; the fungi that causes athlete's foot yielded an antibacterial substance; gramicidin, still potent against bacteria, was made less poisonous to animals; a chemical from pine trees may prove useful as an antiseptic; sulfa drugs were made more effective against certain bacteria by use in combination with dyes; a new antibiotic substance, "puchiin," resembling penicillin in its action, was found in Chinese water chestnuts; bacitracin, an antibiotic, was isolated from bacteria found in wounds.

BIOLOGICAL SCIENCES

Several powerful new pesticides, restricted to military and experimental uses during the war, were released for civilian employment; they include DDT and Gammexane (British) against insects, 1080 and ANTU against rats, 2-4-D and ammonium sulfamate against weeds, and G-412 and G-410 specifically against ragweed.

Formulas for several effective mosquito repellents were released by the Army and Navy.

Heartbeats of birds, many times more rapid than those of humans, were counted with a sensitive electrical instrument attached to the twig on which the bird perched or even under the nest.

Plant disease viruses, far too small to be seen with any instrument, were studied by depositing gold films, eight Angstroms thick, on protein particles of submicroscopic size and using an electron microscope.

Bacteriophage, foe of disease germs, formerly invisible, was seen through an ordinary microscope after being treated with a dye and irradiated with ultraviolet rays.

Antibiotic substances similar in action to penicillin were found in lichens, in wilt-resistant tomato plants, in leaves of Scotch thistle, mullein and peony, and in the fruits of blueberry, currant, mountain-ash and honeysuckle.

Mosquito larvae were found to get cramps and drown when breeding ponds are treated with DDT.

Bacteria-like parasites within the bodies of cockroaches were killed with penicillin; soon the cockroaches died also.

Mushrooms, proverbially shortest-lived of plants, were found alive thirty-five years after being sealed up in glass tubes under high vacuum.

Oysters were induced to produce eggs in winter for research purposes by warming them up to midsummer temperature.

Love-songs of mate-seeking mosquitoes were recorded on phonograph records for use in luring the pests to their death in insect traps.

Fungus that causes one of the most destructive of plant diseases, flax wilt, was found to be a potential source of most of the B vitamins.

Ergot, an ecbolic and hemostatic, was successfully cultivated under tropical conditions in India.

A NEW ULTRA HIGH-SPEED CAMERA with self-contained, high intensity light source was developed at the request of the Army's Surgeon General. It enables photographically unskilled amateurs to take the most perfect pictures yet obtained of surgical operations, and will have many uses in science. Surgeon General Norman T. Kirk is shown inspecting the camera.

Radioactive phosphorus injected into the body of a pregnant female mouse was found in the full-grown offspring three months later.

New sources of quinine were located in South America: some species of cinchona were found more abundant than previously believed; the bark of other species was found to produce good yields of quinine.

Large-scale soilless gardens were established in a number of out-of-the-way places in the tropics to produce otherwise unavailable salad vegetables for air force personnel.

Plant growth was speeded by weak solutions of colchicine, the "evolution chemical" used previously to originate new species of plants by multiplying the heredity-bearing chromosomes of old ones.

Carotin, yellow pigment in plants, was found essential to reproduction in cattle.

Tomato plants were stimulated to highest production by protecting them from the heat of the early afternoon sun with tar-paper coverings.

Rubber was extracted from the leaves of *Cryptostegia grandiflora*, a tropical milkweed-like vine, through bacterial fermentation.

Ways were studied of utilizing for livestock feeds the B vitamin manufactured in the cow's stomach and excreted with digestive wastes.

A variety of lettuce that does not "go to seed" with warm weather, called slobolt, was announced.

Resumption of scientific expeditions began with plans for one early in 1946 to Nyasaland, South Africa, to study small animal life.

One species of black wasp was found to kill crop-devouring Mormon crickets at the rate of one million per square mile each season.

Embryo corn plants, cut from kernels with dissecting needles, were successfully grown in sterile laboratory vials.

DDT-rotenone spray was proved practical and economical in controlling cattle ticks in the tropics, making cattle dips unnecessary.

Genes, the heredity-determining units within a cell, were reported as being seen at work, chemically influencing the course of physiology.

ATOMIC POWER

Dropping of an atomic bomb on Hiroshima, Japan, was announced by President Truman on Monday, Aug. 6. A second bomb of the same character was dropped on Nagasaki on Wednesday, Aug. 8.

The War Department released on Aug. 10 a semi-technical report on the processes by which the use of atomic energy for military purposes had been achieved. It was written by Dr. H. D. Smyth of Princeton at the request of Maj. Gen. L. R. Groves, U. S. Army, head of the "Manhattan Project" which was the Army's designation of the atomic bomb project.

In a foreword to the Smyth Report, Gen. Groves stated: "All pertinent scientific information which can be released to the public at this time without violating the needs of national security is contained in this volume—Persons disclosing or securing additional information by any means whatsoever without authorization are subject to severe penalties under the Espionage Act."

Reports by the British and Canadian governments on their share in developing the atomic power project were released simultaneously with the Smyth Report.

The Smyth Report revealed the following steps in the development of the atomic bomb—these steps had previously been withheld from publication by a voluntary secrecy agreement set up by the scientists working on the problem.

Possibility of using the large amounts of energy released by nuclear fission for production of a bomb began in 1939 with confirmation of the announcement of fission of uranium—European-born physicists were instrumental in getting U. S. government support for this project. Scientists voluntarily restricted publication of papers on the subject of uranium fission in scientific journals.

Fission of uranium isotope of atomic weight 235 was the only likely source of atomic power at the time the U. S. government took up the atomic power project.

Research on U 235 fission, using heavy water (D_2O) as the moderator, was under way in both England and Germany in 1939. American scientists substituted specially purified graphite for heavy water.

In order to make the fission reaction self-sustaining, it was found necessary to separate U 235 (less than 0.5% in any uranium sample) from the more abundant isotope U 238 (more than 99%). The more common kind prevents the chain reaction, by absorbing neutrons.

An enormous isotope separation plant, using gaseous diffusion methods, was erected at Oak Ridge, Tenn. Much of the experimental work for the whole project was done there.

Formation of element 94 from Uranium 238 by neutron capture was effected in the Radiation Laboratory of the University of California in 1941. The new element was found to undergo slow neutron fission like Uranium 235. It was named Plutonium.

Plutonium (Pu), element 94, radioactive but approximately as stable as radium, was obtained from Uranium 238, element 92, by way of the intermediate short-lived element 93, named Neptunium (Np). At least two isotopes of each of the new elements, 93 Np 238, 93 Np 239, 94 Pu 238, 94 Pu 239, are known. Uranium 238 changes to Neptunium and Neptunium to Plutonium by beta-ray transformation. Plutonium emits an alpha ray and slowly changes back into U 235.

Manufacture of Plutonium from U-238 allowed utilization of the inert uranium isotope for atomic power purposes. It allowed the advantage of sharp chemical separation of different elements instead of the tedious diffusion methods of isotope separation.

On Dec. 2, 1942, the first self-sustaining nuclear chain reaction ever initiated by human beings began, at West Stands pile, Stagg Field Stadium, Chicago.

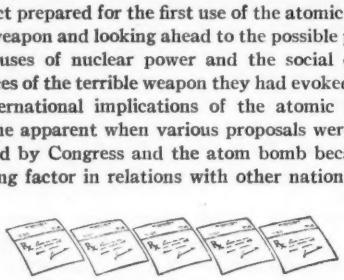
The organization of the atomic bomb project was at first under OSRD. During 1942 and the spring of 1943, control was gradually shifted to the Army, and in May 1943 the Army Engineer Corps took over.

Production of materials for atomic bombs was at first planned to be located at the Clinton Engineer Works at Oak Ridge in the Tennessee Valley. Later the plant for full-scale manufacture of Plutonium was built at Hanford, Wash., and the bomb labora-

tory was located at Los Alamos, New Mexico.

July, 1945, the date of completion of the Smyth Report, found the scientists who had worked on the project prepared for the first use of the atomic bomb as a weapon and looking ahead to the possible peacetime uses of nuclear power and the social consequences of the terrible weapon they had evoked.

International implications of the atomic bomb became apparent when various proposals were considered by Congress and the atom bomb became a growing factor in relations with other nations.



CHEMISTRY AND PHYSICS

Discovery of elements 95 and 96, made by bombardment of Uranium 238 and Plutonium 239 with high energy alpha particles, was announced, thus raising the number of trans-uranic elements discovered as the result of the atomic bomb research to four.

Discovery of Neptunium 237, an isotope of element 93, was announced.

A 100,000,000-volt electron accelerator or betatron for X-rays was perfected; it may also produce other forms of radiation available before only in the cosmic rays.

A 100-ton electronic differential analyzer was announced; no longer needed for secret war research, it is now used to solve scientific and industrial engineering problems for which it was designed.

A tiny oscillator tube, more powerful than any broadcast station, but which gives off its power burst within one-millionth of a second, has been used in radar, it was announced.

Automatic radar recording camera was developed that photographs the radar image on the radar oscilloscope while the operator is watching it.

The proximity or VT fuze exploded projectiles on approaching a target close enough to inflict damage; a miniature radio station in the nose of the shell sends out impulses which are reflected back by a target, the frequency of the echo changing as the target is approached.

Television pictures in full color were successfully transmitted through the air by use of ultra-high frequency radio waves.

Thin stainless steel film on optical glass disks, placed before wide angle lenses, was found to eliminate the problem of "hot spots" on aerial photographs.

An electrical micrometer, so sensitive that it can measure movements as small as one-tenth of a millionth of an inch without touching the object, was developed.

Knowledge of the ionosphere and of the relation of solar activity and geomagnetic and auroral conditions to short-wave radio transmission was advanced to the point where long-range prediction of reception became an actuality.

Chemical analysis of gases, liquids and solids was perfected by shooting X-rays through substances to determine the chemical elements present.

A new elastic electrical insulating enamel made from sand-based silicone was developed to withstand extreme temperature changes and exclude moisture.

Plastics plated with metal produced materials which were found to have inherent properties of the plastic in addition to the desired properties of the deposited metal.

Vinyl chloride co-polymers, new rubberlike plastics, were made by passing acetylene and hydrogen chloride over catalysts.

Quick-molding odorless thermoplastic from cellulose and propionic acid, with electrical properties little affected by atmospheric changes, was made possible by development of a commercially practical process for producing propionic acid from natural gases.

A chemical test for the quality of butter was developed using xylol and replacing the ordinary taste and smell method.

Lightweight, fire-resistant building material, using cement and organic and inorganic fibers and a bit of an inexpensive chemical, which insulates against heat and cold and is nonrotting and termite proof, was developed.

Synthetic organic cements were developed which will hold metal plates without riveting or can be used to bond wood, plastics, rubber or fabrics to a similar substance or one to another.

Sono-radio buoys, that pick up submarine noises by hydrophones and transform them into radio signals, were announced.

An electrochemical method of filtering water freed it of undesirable mineral salts by passing it through two beds of ion-exchange resins.

A perfect mold of optical glass weighing 379 pounds, the largest ever obtained for a scientific instrument prism, was made.

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VETERANS SURVEYED BY RUTGERS

A survey of former students and graduates by the Rutgers University College of Pharmacy indicates that about half of the returning veterans desire help from the College in obtaining employment. Approximately 57% want some kind of refresher course. Of these, a little more than three-fifths want to review courses previously taken in college, while two-fifths especially want to be brought up to date on newer developments in the field.

The Rutgers College is presenting 5 refresher courses and has arranged for a seminar program to be presented by leaders from pharmaceutical industry.

DR. H. A. B. DUNNING CONTRIBUTED TO DEVELOPMENT OF ATOMIC BOMB

A WELL-KNOWN scientist, manufacturing pharmacist, past president of the AMERICAN PHARMACEUTICAL ASSOCIATION and present member of its Council, was accorded recognition for his contribution to development of the atomic bomb at a testimonial dinner given by The Johns Hopkins University in Baltimore on Monday evening, November 26th.

Henry Armitt Brown Dunning of the firm of Hynson, Westcott and Dunning was the recipient of the tribute paid by Dr. Isaiah Bowman, the University's president, who stressed the fact that a working partnership between industry and education had existed long before the outbreak of World War II.

A. PH. A. COUNCIL MEMBER AND PAST PRESIDENT OF ASSOCIATION LAUDED FOR HIS FORESIGHT IN SUPPORTING WORK LEADING TO VICTORY WEAPON

"When we contemplate the atomic bomb as a finished product," said Dr. Bowman, "we must pay tribute to those who had the vision to contribute to nuclear science in its infancy. Dr. Dunning is in this honored company. By his interest as well as support of our work for years before the war, he made possible the contribution of the atomic bomb to Allied victory."

The Johns Hopkins dinner took the form of a testimonial to more than one hundred men and women of its staff who were actively engaged in the development of the VT or proximity fuze and the atomic bomb and many other projects. The guest speaker was Maj. Gen. Leslie R. Groves, director of the Manhattan District which was charged with the development of the bomb, who presented to Dr. Bowman a certificate signed by the former Secretary of War, Henry L. Stimson, stating that Johns Hopkins did "work essential to the atomic bomb thereby contributing to the conclusion of World War II."

In describing the part taken by Dr. Dunning in connection with the bomb's development, it was pointed out that Dr. Robert Dudley Fowler, professor of chemistry at Hopkins, and one of his students, Dr. R. W. Dodson, in 1939 confirmed the discovery by Hahn and Strassmann of the uranium fission.

It was explained that the Hopkins scientists did not stop with checking and verifying the German results, but pressed their investigations further. The research involved was extremely expensive and funds were not available in the regular budget of the University. Outside help was therefore necessary; and Dr. Dunning, whose vision and foresight had long been recognized by his associates, was approached to see if he would be interested in the type of work being undertaken.

At this stage emphasis was concentrated upon

attempts to separate uranium into its two isotopes, uranium 238 and uranium 235; and Dr. Dunning was quick to realize the possibilities of the work, not only in the separation of the uranium isotopes, but also the possibilities that lay in the separation of other isotopes; and he agreed upon a general program of isotope separation in collaboration with Dr. Fowler and Dr. H. S. Brown, one of Dr. Fowler's students.

Uranium hexafluoride was the only volatile compound of uranium known at the time, and it had been prepared only three times previously and then only in small amounts.

The preparation of this compound had been marked with difficulties because of its great chemical reactivity. After considerable difficulty the Hopkins researchers devised a new and much simpler method of producing the compound on a larger scale, and with Dr. Dunning's consent the patents of the process were given to the Federal government. The processes were later adopted by the Manhattan Engineer District and used industrially to produce thousands of pounds of hexafluoride for one of the secret plants which was connected with the atomic bomb project.

In the development of this process for making uranium hexafluoride much experience was gained in the production and handling of other reactive chemicals on a scale hundreds of times larger than ever had been done before.

As a direct consequence of this experience and with equipment set up through Dr. Dunning's aid, the contract was given the University by the Office of Scientific Research and Development in November, 1941, to produce some hitherto unknown compounds. For two or three months attempts were made to produce these new compounds without success. But in February, 1942, a process was devised which met with complete success. It resulted in the discovery of dozens of new compounds. The experiments opened a whole new field of chemistry.

The new materials were much needed for plants of the Manhattan Engineer District at Oak Ridge.

After the initial success of the process, a pilot plant was built and thousands of pounds of material were produced.

The Hopkins project constituted the only source of these materials for the atomic bomb project until the process could be put in large-scale commercial operation.

Without the interest and support of Dr. Dunning, the Hopkins' scientists declare, very important contributions to the atomic bomb could not have been made. "Had it not been for Dr. Dunning's lively imagination, it is very likely that the development of the bomb would have been seriously delayed," the scientists assert.

DAWN OF VICTORY . . .

THE JOHNS HOPKINS UNIVERSITY

Baltimore, Maryland

Office of the President

August 7, 1945

Dear Dr. Dunning:

I am thinking of you this morning in connection with the big news.* You must be pleased at the outcome of the interest you have shown and the help you have given in an enterprise of such vital importance.

I want to thank you in person at the first opportunity.

With appreciation and best wishes.

Sincerely yours,
(signed) *Isaiah Bowman*

Dr. H. A. B. Dunning
Hynson, Westcott and Dunning
Charles and Chase
Baltimore, Maryland

* re atomic bomb

PENICILLIN ALLERGIES AGAIN NOTED

That penicillin may occasionally cause allergic reactions is again emphasized in a report by Dr. J. H. Lamb of Oklahoma City (*Arch. Dermatol. Syphil.*, 52: 93, 1945), citing two cases of vesicular eruption. Neither reaction was of serious consequence except that the drug had to be discontinued because of extreme pruritus.

Patients to be treated should be questioned about previous reactions to fungi, he suggests. If such reactions have occurred an intradermal test for sensitivity should be made with 500 to 1000 units.

USE AND MISUSE OF VITAMINS

PROPER ROLE OF SUPPLEMENTARY AND THERAPEUTIC CONCENTRATES CONFUSED BY CONFLICTING CLAIMS BUT LEGITIMATE NEED IS GREAT

UNWISE exploitation of vitamins by some less responsible firms has led to considerable confusion, not only of the public but of the professions as well, concerning the legitimate uses of these preparations. Misinformation naturally thrives in a relatively new field where investigators themselves have not reached agreement on a number of points.

The danger in this situation is pointed out by Dr. Norman Jolliffe of New York City, who prepared an authoritative discussion on the use and abuse of vitamins for the Council on Foods and Nutrition of the American Medical Association (*J. Am. Med. Assoc.*, 129: 613, 1945).

"When a person buys a vitamin product as a panacea," the report stated, "it makes little difference whether he does so because of unbounded claims over the radio, in newspaper or magazine advertisements, syndicated health columns or magazine articles or by a druggist, a doctor or a friend; the expected miracle often fails to materialize. The resulting disappointment, multiplied many thousand times, may lead to a loss of public confidence and the eventual rejection of the good in scientific nutrition as well as the bad in its exploitation. Already there are indications that interest and faith in nutrition have begun to wane."

Pharmacists, like physicians, are frequently consulted for nutritional information. Since patrons will usually place more faith in the pharmacist than in a radio commercial, injudicious advice may actually be more detrimental to good nutrition than misinformation in radio advertising.

To date there has been insufficient distinction between supplementary and therapeutic vitamin preparations. Most products on the market are of the supplementary type, to be taken with the regular diet to assure adequate intake of the nutrients specified. In ordinary dosages these preparations are not sufficiently potent to be of value in treating actual vitamin deficiencies.

Supplementary preparations are *preventive*, and may be prescribed by the physician in pathologic conditions requiring increased vitamin intake or where the diet, for one reason or the other, is not satisfactory. These products ordinarily supply in one dose or divided doses the amounts shown in the following table taken from Dr. Jolliffe's report. Both supplementary and therapeutic preparations may consist of a single vitamin or combinations of vitamins.

SUPPLEMENTARY VITAMIN MIXTURES

Vitamin A	4000–5000	I. U.
Vitamin D	400–800	I. U.
Thiamine hydrochloride	1–3	mg.
Riboflavin	2–3	mg.
Niacin amide	10–20	mg.
Ascorbic acid	30–100	mg.

Even though an unsatisfactory diet may be lacking in essentials other than these vitamins, Dr. Jolliffe indicates that for those persons who do not or cannot regularly consume a satisfactory diet a proper vitamin supplement should be prescribed. Dr. Jolliffe takes issue with some authorities who believe that a vitamin supplement may conflict with obtaining the best possible dietary.

"It should be noted," he says, "that the increase in vitamin sales between 1939 and 1944 coincided with, and did not prevent, a decided improvement in the per capita American diet. It may be that vitamin supplements call to the attention of their users the importance of a satisfactory diet."

As a simple but not infallible guide to a satisfactory and adequate diet the following check list was suggested:

CHECK LIST FOR A SATISFACTORY DIET

Include at least:

(1) 4 eggs weekly.
(2) 1 serving daily of citrus fruit, tomato or their juices, or fresh uncooked salad greens.
(3) 1 quart of milk daily for children, with an extra source of vitamin D.
1 pint of milk daily, or its equivalent in cheese, for adults.
(4) 1 serving daily of lean meat, fish, poultry or seafood.
(5) 1 serving daily of a cooked leafy green or yellow vegetable.
(6) 1 serving daily of another vegetable or fruit.
(7) 1 portion daily of enriched or whole grain bread or cereal.

When true deficiency disease has developed from inadequate diet or from conditions which increase the requirements for vitamins or interfere with their digestion, absorption or utilization, the supplementary dosage levels, designed as preventive, are no longer sufficient. The Council article points out that therapeutic levels are usually three to five but may be ten or more times the minimum daily requirements.

Obviously, expert medical diagnosis and carefully formulated therapy are essential when deficiency disease exists. Competent diagnosis is made from anatomic, chemical or physiologic alterations characteristic of deficiency disease, evaluated in the light of the history and of clinical and laboratory findings.

"Adequate therapy of deficiency disease," Dr. Jolliffe states, "requires not only sufficient administration of the specific nutrient long enough to obtain maximum reversal of the manifest lesion but also, in addition, the restoration of tissue normal in all the essential nutrients. This can best be accomplished by a judicious combination of diet, a source of the whole vitamin B complex, the essential vitamins (vitamin A, D, B_1, B_2, C and niacin amide) and specific therapy."

It is recommended that the physician prescribe the entire vitamin B complex, preferably in the form of brewers' yeast, brewers' yeast extracts or crude extracts of whole liver, liver concentrates or desiccated liver, wheat germ or rice-bran extracts. These natural sources were not suggested because of their content of thiamine, niacin and riboflavin, but because of other B complex nutrients not yet synthesized.

"Many conscientious physicians have been lulled into the belief that a dose of several milligrams of a yeast or liver fraction fortified with synthetic vitamins, in a capsule or a pleasantly flavored syrup or elixir, constitutes adequate B complex therapy," Dr. Jolliffe observed. "Liver and yeast products should be administered in grams and ounces rather than in grains and milligrams."

Because deficiency disease usually involves a multiple tissue deficiency of the fat- and water-soluble essential vitamins, a preparation containing large amounts of these vitamins is also given. A suggested formula is as follows:

Vitamin A	25,000	I. U.
Vitamin D	1,000	I. U.
Thiamine	5	mg.
Riboflavin	5	mg.
Niacin amide	150	mg.
Ascorbic acid	150	mg.

The physician will usually prescribe the preparation in this dose twice daily for a week or ten days, then once a day.

Specific vitamins indicated by the particular nutritional disease are added to the therapy of diet, vitamin B complex and essential vitamins. For lesions of vitamin A deficiency, 50,000 to 150,000 I. U. of vitamin A may be prescribed; other vitamin deficiency lesions may require 10 to 20 mg. or even 100 mg. of thiamine, 5 to 15 mg. of riboflavin, 100 to 1000 mg. of niacin amide and 100 to 1000 mg. of ascorbic acid.

In view of the above regimen required for adequate therapy of true vitamin deficiencies, Dr. Jolliffe points out that therapeutic claims for supplementary levels of vitamins is one of the principal abuses of vitamin promotion to the laity. Under special conditions, in mild cases of deficiency, supplementary levels may be effective. But since even those physicians who are nutrition experts "seldom, if ever, treat a deficiency disease with vitamin doses in supplementary levels, it does not seem to be in the public interest for therapeutic claims, no matter how qualified, to be made in advertising supplementary levels."

Dr. Jolliffe cites the "failure to tell all" in some advertising as another contributing factor to misconceptions concerning the legitimate uses of vitamins. Among such examples he cites the stressing of economy of vitamin preparations as compared to food costs; incomplete quotations or statistics from the literature; enumeration of signs and symptoms of deficiency disease which vitamins will prevent but without information that such symptoms are not specific for nutritional disorders; implications that the vitamin user will become more alluring to the opposite sex (except as far as the preparation will maintain normal health); and implications that natural vitamins are superior or safer than synthetic vitamins.

In refuting any claims on the latter point, the Council article cites the statement of the National Research Council's Food and Nutrition Board that "there can be no possible difference between thiamine prepared synthetically and that which is extracted from a natural source of thiamine such as wheat or meat (or yeast). The same is true of riboflavin and of other vitamins that thus far have been synthesized. A vitamin is a chemical compound whether it is made by nature or by man."

The third possible source of confusion concerning vitamins is "advertising puffery." Examples cited are claims for some vitamin or mineral whose value in human nutrition has not yet been established; claims that vitamins will

enable a person to neglect his diet; implying that a normal person who consumes a satisfactory diet will feel better if he takes vitamin supplements; and inferences concerning either the ease or the impossibility of the average consumer's obtaining an adequate diet from food alone.

As the dispenser of vitamins and an adviser to physicians on pharmaceutical products, it is important that the pharmacist keep in mind the basic rationale of the proper use of vitamins and the common types of misconceptions concerning their role in nutrition, as have been quoted from the material published by the A. M. A.'s Council on Foods and Nutrition.

That there is a very large legitimate need for vitamin supplements and therapy, within the bounds of our present scientific knowledge of vitamins in nutrition, is indicated by a report from the Department of Agriculture's Bureau of Human Nutrition and Home Economics.

Although the evidence indicates that there has been a steady improvement in the dietary of the American public over the past few years, about three-fourths of the nation's families reportedly had diets in 1936 that did not meet the National Research Council's recommendations for riboflavin; and about half had diets that were low in calcium, thiamine and ascorbic acid. It is estimated from a survey in the spring of 1942 that "the diets of more than half of the families still did not meet the recommended allowances for riboflavin and that the proportion of diets low in calcium had been reduced to less than a third; the proportion low in thiamine to a fourth, and the proportion low in ascorbic acid, in which there was the greatest improvement, to less than a tenth.

"Some of the improved situation in respect to ascorbic acid was a result of seasonal increases in the consumption of citrus fruit and leafy greens. There was also a great reduction in the estimated proportion of families that had diets failing to meet current recommendations in vitamin A value, iron and protein, from about a fourth in the earlier period to around a tenth in the later period."

Department of Agriculture estimates show that in 1944 the amount of food entering the civilian market contained a satisfactory level of nutrients, after allowances for edible waste and cooking losses, when figured on a daily per capita basis. It is emphasized, however, that the pattern of distribution is uncertain, which probably means that a large number of people received amounts above or below the average per capita consumption.

On the other hand, Dr. R. M. Wilder has explained that the National Research Council's recommended daily allowances of nutrients, usually used as a standard for comparisons, contain at least a 30% margin of safety to provide for persons whose nutrition requirements may be above average. It does not necessarily follow, therefore, that everyone whose diet does not measure up to the recommended allowances has a need for vitamin supplements or therapy.

Although these factors lead to varying evaluations of the prevalence of vitamin-deficient diets, Dr. Jolliffe concluded that "compared to the satisfactory diet, there is a high prevalence of unsatisfactory diets in all sections of this country. To take any other stand is to ignore the facts."

PENICILLIN DISTRIBUTION IMPROVED BY THREE-POINT CPA PROGRAM

Supplies of parenteral penicillin, irregular in many areas late in 1945, will be much improved hereafter through a three-point program of the Civilian Production Administration. Factors contributing to the spot shortages, according to government officials, were: decreased production due to poor quality of corn steep liquor used for growing the mold; rising foreign demand; and diversion of production to oral and topical forms.

To meet this situation the CPA re-introduced a limited form of control over distribution; restored export controls through the Office of International Trade Operations of the Department of Commerce; and joined with industry to assure that a higher grade of corn steep liquor would be available.

Under the direction covering distribution, producers must treat orders from civilian, Public Health Service and Veterans' hospitals as though they bear CC preference ratings, next highest to military priority. Manufacturers are required to give preferential treatment to such orders up to 40% of their current production, and all penicillin which a producer buys for resale is subject to preferential orders.

Because increased production of penicillin tablets, capsules and ointments has somewhat decreased production in the injection form, producers are required to operate their facilities wherever possible to provide adequate quantities of penicillin in the dosage forms required to fill hospital and certified orders.

No procedure for placing preferential orders from private physicians or pharmacists was made available, but officials believe that export controls and better distribution will provide sufficient supplies through customary channels.

NEW AND NONOFFICIAL REMEDIES

recently accepted by the

COUNCIL ON PHARMACY AND CHEMISTRY, AMERICAN MEDICAL ASSOCIATION

Council descriptions of drug products are published regularly in This Journal as they are accepted. Rules upon which the Council bases its action appeared in the November, 1945, issue (6: 329, 1945) and may be secured in pamphlet form upon request to the Secretary, Council on Pharmacy and Chemistry, American Medical Association, 535 N. Dearborn St., Chicago 10.

INTOCOSTRIN.—A curare preparation containing therapeutically desirable constituents of curare.

Actions and Uses.—Intocostrin has been shown by physiologic tests to have a substantially pure curare action; that is, it paralyzes the skeletal muscles. This paralysis results from an interruption of the nerve impulse at the myoneural junction. The diaphragm and intercostal muscles are usually the last to be affected. The action of the drug is brief because of rapid excretion and destruction. If respiration is embarrassed or arrested, neostigmine, a physiologic antidote, will assist in counteracting the curare effect, but properly instituted artificial respiration may be necessary to maintain respiration until the curare effect has diminished. The curare activity in intocostrin is due almost wholly to the presence of an alkaloid, d-tubocurarine, which accounts for about half the total solids in intocostrin. This alkaloid has been isolated as a pure crystalline salt. Intocostrin may be used to soften the severity of convulsions and to prevent fractures in shock therapy of mental diseases; to produce muscular relaxation during the reduction of fractures or dislocations, or during certain manipulative diagnostic procedures; to produce a more or less transient reduction of hypertonia, tremor, incoordination, athetosis and dysarthria in certain neurologic conditions and, with certain precautions, to aid in the diagnosis of myasthenia gravis.

Intocostrin can be used by those experienced in such use as an adjuvant to anesthesia. *The drug is not, however, without its dangers.* Overdosage produces paralysis of the respiratory muscles. Experimental work on dogs indicates the possibility of added toxic effects following the use of large doses of atropine with curare. Clinically, however, no difficulty has been encountered with therapeutic doses of belladonna alkaloids, and it is claimed that such premedication is desirable. The value of intocostrin in anesthesia is the development of adequate muscular relaxation. It is claimed that the amount of anesthetic and depth of anethesia may be decreased.

Dosage.—In softening the convulsions of shock therapy or to produce relaxation in manipulative procedures: 0.5 unit per pound of body weight (but the initial dose for adults should be 20 units less than this total), administered intravenously at a uniform rate during one to one and one-half minutes. Larger doses may be necessary, but if the estimated dose fails to produce paralysis another full paralyzing dose should not be given for twenty-four hours. Preparations should always be made to cope with respiratory failure. Neostigmine, 2 cc. of 1:2000, should be at hand for intravenous injection if required, and an airflow should be available on the tray to assist in artificial respiration in the event of obstructed breathing. In spastic and athetoid states in children: 0.5 to 1.5 units per pound of body weight administered intramuscularly at four-day intervals. As a diagnostic agent in myasthenia gravis: one-fifteenth to one-fifth of the average adult dose, intravenously followed always in two or three minutes by the intravenous injection of 1.5 mg. of neostigmine methylsulfate with 0.65 mg. of atropine sulfate.

In order to obtain muscular relaxation during light (second plane) anesthesia with cyclopropane, nitrous oxide or barbiturates, 40 to 60 units of intocostrin may be administered when the skin incision is made: 20 to 30 units may be added in three to five minutes, if needed. If the operation has lasted more than forty-five minutes, an additional dose of 30 to 40 units may be cautiously administered if such additional dosage seems indicated. In an alternative method as much as 100 units has been administered in a single intravenous injection at the beginning of or during anesthesia, but no additional quantities should be given following this large dose until some time has elapsed and then extreme caution exercised. The drug apparently may be used with any type of anesthetic agent, *although with ether only about one-third of the dose otherwise employed should be used.* It must be remembered, however, that the use of intocostrin as an adjuvant to surgical anesthesia is still in a stage which requires continued careful study.

Curare has been extensively used with sodium pentothal anesthesia, usually by separate injection. If a barbiturate solution (alkaline) is mixed with intocostrin solution (acid) a precipitate is formed, which is redissolved when a sufficient amount of the barbiturate with its buffer has been added. The precipitate is the free barbituric acid derivative. If an intocostrin solution is alkalized with sodium

carbonate, no loss in potency occurs during a twenty-four hour period and no precipitate forms when the alkalized solution is mixed in any quantity with a barbiturate solution. Such mixtures have not been used clinically; the present method is to inject the solution separately and alternately through a Y-tube using the same needle. When by this method intocostrin follows the barbiturate, a slight fine precipitate forms at the surface of contact of the two solutions. It has been the custom to allow such a precipitate to be injected slowly, as it presumably redissolves on mixing with the plasma.

Preparation.—

Intocostrin prepared from Chondodendron tomentosum extract is made by first extracting with alcohol a desiccated curare obtained from a heavy syrup of the bark and stems of Chondodendron tomentosum. The alcoholic extract is evaporated to dryness; a sterile filtered solution having a *p*H of 4.6–4.8 is made and adjusted to a standard potency of 20 units per cubic centimeter. The final solution contains sodium chloride 0.45 per cent and trichlorobutanol 0.5 per cent; sterilized by filtration and its *p*H again adjusted to 4.6–4.8.

In the preparation of intocostrin from pure d-tubocurarine chloride crystals, the crystals are obtained from the desiccated curare or from the crude syrup.

Tests and Standards.—

Dilute in a large pyrex test tube 0.25 cc. of intocostrin with 25 cc. of distilled water and add 0.2 cc. of concentrated sulfuric acid and 2 cc. of 1 per cent potassium iodate solution. Mix and warm in a water bath at 50 C. for one-half hour. A yellow color is developed.

The physiologic activity of intocostrin is determined on rabbits: the provisional unit is equivalent to the potency 0.15 mg. of d-tubocurarine chloride.

E. R. SQUIBB & SONS, NEW YORK

Intocostrin Solution: 10 cc. vials. Each cubic centimeter contains an amount of intocostrin equivalent to 20 units: sodium chloride 0.45 per cent and chlorobutanol 0.5 per cent as a preservative.

NIKETHAMIDE (See New and Nonofficial Remedies, 1944, p. 330).

The following dosage form has been accepted:

GEORGE A. BREON & CO., KANSAS CITY, MO.

Sterile Solution Nikethamide 25% W/V: 1½ cc. ampuls.

SULFADIAZINE (See New and Nonofficial Remedies, 1944, p. 178).

The following dosage form has been accepted:

AMERICAN PHARMACEUTICAL CO., INC., NEW YORK

Tablets Sulfadiazine: 0.5 Gm.

DIETHYLSTILBESTROL (See New and Nonofficial Remedies, 1944, p. 417).

The following additional dosage forms have been accepted:

GEORGE A. BREON & CO., KANSAS CITY, MO.

Tablets Diethylstilbestrol: 5.0 mg.

Caplets Diethylstilbestrol: 5.0 mg.

PENICILLIN (See Supplement to New and Nonofficial Remedies, 1944, p. 18).

The following dosage form has been accepted:

SMITH-DORSEY COMPANY, LINCOLN, NEB.

Penicillin (Sodium Salt): 100,000 Oxford unit vials and 100,000 Oxford unit vials packaged with an accompanying 20 cc. vial of isotonic solution of sodium chloride.

CHAS. PFIZER & CO., INC., BROOKLYN

Penicillin Calcium: 200,000 Oxford Unit bottles.

SULFANILAMIDE (See New and Nonofficial Remedies, 1944, p. 184).

The following additional dosage form has been accepted:

THE SMITH-DORSEY CO., LINCOLN, NEB.

Sulfanilamide (*Powder*): 5 Gm. vials.

SULFATHIAZOLE (See New and Nonofficial Remedies, 1944, p. 191).

The following additional dosage form has been accepted:

THE SMITH-DORSEY CO., LINCOLN, NEB.

Sulfathiazole (*Powder*): 5 Gm. vials.

ALLERGENIC PREPARATIONS (See New and Nonofficial Remedies, 1944, p. 35).

The following extract now stands accepted:

WYETH, INC., PHILADELPHIA

Allergenic Extract: The following extract is marketed in treatment packages of five 1 cc. size cartridge ("Tubex") vials representing graduated concentrations, namely 100, 1000, 6000, 20,000 and 20,000 pollen units per cubic centimeter. Also in treatment packages of five 1 cc. size cartridge ("Tubex") vials, each representing 20,000 pollen units per cubic centimeter.

Ragweed Combined (Giant and Short Ragweeds, in equal proportions).

The pollen is weighed and extracted with ether. After removal of the ether the material is mixed with the extracting liquid, consisting of a 0.5 per cent sodium chloride solution containing approximately 0.28 per cent of sodium bicarbonate and 0.5 per cent of phenol and covered with toluene. After three days the extract is subjected to Berkefeld filtration and tested for sterility. Standardization is on the basis of pollen units, 1 pollen unit being equivalent to 0.001 mg. of pure pollen.

MENADIONE (See New and Nonofficial Remedies, 1944, p. 638).

The following dosage forms have been accepted:

SHARP & DOHME, INC., GLENOLDEN, PA.

Tablets Menadione: 1 mg.

Solution Menadione (in peanut oil) 2 mg. per cc.: 1 cc. ampuls.

SULFADIAZINE (See New and Nonofficial Remedies, 1944, p. 178).

The following dosage form has been accepted:

MCNEIL LABORATORIES, PHILADELPHIA

Tablets Sulfadiazine: 0.5 Gm.

THIAMINE HYDROCHLORIDE (See New and Nonofficial Remedies, 1944, p. 608).

The following dosage form has been accepted:

AMERICAN PHARMACEUTICAL CO., INC., NEW YORK

Tablets Thiamine Hydrochloride: 1 mg.

VITAMIN B COMPLEX SYRUP.—A syrup prepared from a concentrated extract of dried brewers' yeast and an extract of corn processed with Clostridium acetobutylicum, with inverted cane sugar 40 per cent weight by volume and natural flavoring.

Actions and Uses.—Proposed for prophylaxis and treatment of conditions arising from deficiency of the vitamin B complex.

VI-CO PRODUCTS CO., CHICAGO

Vitamin B Complex Syrup: Each 5 cc. contains thiamine hydrochloride 1.5 mg., riboflavin 1.0 mg., pyridoxine hydrochloride 0.5 mg. and nicotinic acid 7.0 mg. , with other vitamin B complex factors as extracted from 10 Gm. of dried brewers' yeast.

U. S. Patent 2,193,876 (March 19, 1940; expires 1957).

THEOPHYLLINE ETHYLENEDIAMINE (See New and Nonofficial Remedies, 1944, p. 373).

The following dosage forms have been accepted:

BARLOW-MANEY LABORATORIES, INC., CEDAR RAPIDS, IOWA

Tablets Aminophylline: 0.1 Gm. and 0.2 Gm.

AMERICAN PHARMACEUTICAL CO., INC., NEW YORK

Tablets Aminophylline: 0.2 Gm. enteric coated with shellac.

Calcium Levulinate (See New and Nonofficial Remedies, 1944, p. 457).

The following dosage forms have been accepted:

CHEMO PURO MANUFACTURING CORP., LONG ISLAND CITY, N. Y.

Calcium Levulinate: 30 Gm. and 480 Gm. bottles.

CARROLL DUNHAM SMITH PHARMACAL CO., ORANGE, N. J.

Calcium Levulinate Injection 10% W/V: 1 Gm. in 10 cc.

BISMUTH SUBSALICYLATE (See New and Nonofficial Remedies, 1944, p. 236).

The following dosage form has been accepted:

THE SMITH-DORSEY CO., LINCOLN, NEB.

Bismuth Subsalicylate in Oil with Chlorobutanol: 50 cc. vials. A suspension of bismuth subsalicylate in peanut oil containing in each cubic centimeter bismuth subsalicylate 0.13 Gm. with 3 per cent chlorobutanol added.

ANTIVENIN (LATRODECTUS MACTANS).—An antitoxic serum prepared by immunizing horses against the venom of the black widow spider (Latrodectus mactans).

Actions and Uses.—This material, which is standardized on the basis of its ability to neutralize the venom of the black widow spider when the two are injected simultaneously in mice, is claimed to be indicated in the treatment of patients suffering from symptoms due to bites inflicted by the black widow spider (Latrodectus mactans). Prior to use, tests for serum sensitivity should be made, test material consisting of 1:10 dilution of isotonic solution of normal equine serum, which is injected intradermally. If there is a positive skin reaction, an eye test consisting of placing a few drops of the test material on the conjunctiva and watching for ten minutes should be undertaken. If there is a negative result from the skin test, the therapeutic serum can be administered. However, if there is a positive reaction in the eye following the positive skin test, serum therapy should be avoided. If there is a positive skin test and a negative eye test, the individual may be desensitized before administering the serum. The amount of material injected into the skin for the intradermal test should be not more than 0.02 cc. of the test material. The result can be evaluated in ten minutes, a positive reaction consisting of an urticarial wheal which is surrounded by a zone of erythema.

Associated treatment includes hot plunge baths, intravenous injection of magnesium sulfate, 20 cc. of 10 per cent solution or intravenous injection of 10 per cent calcium gluconate. Barbiturates may be used for restlessness. Apparently nothing is gained by local treatment at the site of the bite.

Dosage.—An injection of 2.5 cc. of serum is administered intramuscularly.

SHARP & DOHME, INC., PHILADELPHIA

Lyovac Antivenin (Latrodectus mactans): "Vacule" ampul-vial containing a sufficient amount of lyophilized antivenum to yield 2.5 cc. of restored double-concentrated antivenin with phenol 0.35 per cent as a preservative; packaged with a 2.5 cc. ampul of distilled water and one 1 cc. vial of normal horse serum (diluted 1:10) as test and desensitizing material.

A lyophilized antitoxic serum prepared by injecting horses with venom of black widow spiders (Latrodectus mactans).

A process of lyophilization consists in the following: The antivenin in specially designed final containers is immersed in a freezing mixture to congeal the substance rapidly with the least molecular rearrangement. The container is then subjected to a high vacuum to accomplish dehydration, which is continued until the residual moisture content is less than 1 per cent, and finally sealed under vacuum.

PYRIDOXINE HYDROCHLORIDE (See New and Nonofficial Remedies, 1944, p. 618).

The following dosage form has been accepted:

ENDO PRODUCTS, INC., RICHMOND HILL, N. Y.

Solution Pyridoxine Hydrochloride: 1 cc. ampuls of 25 mg. and 50 mg. per cc. and 10 cc. vials of 50 mg. per cc.

The Hospital Pharmacist

EDITORIAL

OPPORTUNITY FOR VETERANS

by LEO F. GODLEY

AMERICAN SOCIETY OF HOSPITAL PHARMACISTS

PHARMACISTS the nation over who are interested in hospital pharmacy and its development are eager to see our services expanded now that increasing numbers of pharmacists are being released from military duty. It is assumed that many pharmacists whose past experience has not been in hospital pharmacy will fill many of the positions in hospitals that never before have employed a pharmacist.

The fact that there is a greatly increased demand for pharmacists in hospitals is an indication that eventually all hospitals of more than 50 beds will have a full-time pharmacy staff. It is a proved fact of hospital economics that in a 50-bed institution there is sufficient need of pharmaceutical services to justify the employment of a hospital pharmacist full time.

The following data were taken from a tabulation of a survey of 82% of U. S. civilian hospitals published by Hudenburg in an article entitled "Statistical Report on Distribution of Facilities" (*Hospitals*, October, 1945):

Bed Capacity	Number of Hospitals	Percentage of Total Group	Pharmacies No.	Pharmacies %
1 to 50	1943	38.9	278	14.3
51 to 100	1120	22.4	347	31.0
101 to 250	1111	22.3	792	71.3
Over 250	819	16.4	720	87.9
	4993	100.0	2137	42.8

The fact that hospital administrators are striving to equilibrate the figures for hospitals and pharmacies is demonstrated by the frequency of requests for hospital pharmacists in the "help wanted" section of pharmaceutical, medical and hospital journals.

Since it is true that all of the pharmacists who aspire to satisfy this demand unfortunately are not trained in hospital pharmacy, it might be well to summarize the essential differences in this type of practice.

First and most important, there is a greater awareness that one is selling a *service* rather than a piece of merchandise. There is little or no exchange of monies. There are no shoppers for bargains nor over-the-counter selling. The "customers" are the in-patients and clinic outpatients of the hospital. There is a close association with all members of the health profession and their inspection is critical and inspiring.

The pharmacist working alone in a hospital for the first time will be greatly bewildered by different applications of familiar routines and techniques. The narcotic picture changes from a rather insignificant factor in retail pharmacy to a major daily consideration. Alcohol being tax free, a door to greater economy in manufacturing is opened. Manufacturing of powders, ointments, tablets and sterile medications presents fertile fields for specialization and economy. Purchasing is an important procedure which requires professional and clerical acumen. Much has been written on the pharmacist as a source of information; certainly in the hospital, his role in this connection is doubly conspicuous. Hence a coveted professional service and dignity is attained through maintaining an adequate library.

It is necessary for the pharmacist inexperienced in hospital pharmacy procedures, who assumes the responsibility of a department, to acquaint himself with hospital pharmacy literature, visit and study well-conducted departments,

and contact other hospital pharmacists through local and national organizations.

The chairman of the American Society of Hospital Pharmacists points out that "the A. S. H. P. has as its objectives the improvement and the extension of the usefulness of hospital pharmacists to their institutions, to the profession of pharmacy and to the members of the other health professions." Our professional publications and national and local organizations are the bonds designed to produce solidarity among hospital pharmacists old and new.

PHARMACY OF PENICILLIN USED BY INHALATION

by **FRANCIS X. STURNER, Chief Pharmacist**
BUFFALO GENERAL HOSPITAL, BUFFALO, N. Y.

IN the wake of a number of papers on the treatment of specific diseases by vapor inhalations of penicillin, this article is offered to bring to the pharmacist information and material for providing physicians with facilities for such treatments as may be deemed desirable.*

Penicillin-susceptible respiratory diseases have been treated in this manner, and a great many successfully. However, when anything beyond a purely local effect is sought, the factor of blood levels, to assure adequate absorption of the penicillin, must be considered to determine whether or not a therapeutic level is being obtained.

Since there is evidence that staphylococci and perhaps other bacteria are vulnerable to penicillin only when dividing and may be unaffected during periods of dormancy, when they are not dividing, it was decided to administer the vapors periodically, once an hour for 12 applications.

This presumably covered the entire division cycle of the bacteria and was considered a day's treatment. In serious and acute illnesses the treatment was administered daily, but in chronic cases it was observed that a day in between treatments was effective. This was determined by observations of the patient's progress and comfort, temperature reactions and general tolerance of the drug and treatment. The patient usually is very cooperative and rather enjoys the experience since he may manage the procedure himself either in the hospital or at home.

Materials needed for preparation of the medication are: vials of penicillin of necessary strength, sterile 10-cc. syringe and needles, bacterial filter, 50-cc. and 100-cc. rubber-capped vials for diluent, sterile dropper bottles for dispensing under certain conditions, solution of epinephrine hydrochloride 1:1000, injectable water and normal saline solution.

* The use of penicillin by inhalation was started at the Buffalo General Hospital in collaboration with Dr. Henry Field, Jr., in February, 1945.

Preparation of Medication

In selecting the diluent for the penicillin, close observation of patients led to the proper types to be used according to certain conditions. Cases which presented a very copious amount of mucus, as in bronchiectasis, reacted best to a solution we will call "A," and cases which had a less copious secretion of mucus, or were even dry, reacted best to a solution we will call "B." Cases which presented a normal amount of mucus but which were being treated for other lung diseases such as abscess, empyema, etc., were treated with solution" B." The formulas for these solutions follow:

SOLUTION "A"

Solution epinephrine hydrochloride, 1:1000	2 cc.
Triple distilled water, *q. s.*	100 cc.

SOLUTION "B"

Solution epinephrine hydrochloride, 1:1000	2 cc.
Solution normal saline	50 cc.
Triple distilled water, *q. s.*	100 cc.

Both solutions represent epinephrine hydrochloride in sufficient amount to clear the respiratory passages and add a prolonging effect to the penicillin without producing the therapeutic effect of epinephrine.

These solutions, when prepared, should be

handled with sterile technique. After preparation they should be filtered through a bacterial filter, or sterilized in a pressure cooker, and filled into sterile rubber-capped vials.

Even though these solutions are not to be injected, the above procedure assures complete protection to the patient. Any amount of diluent may be withdrawn from the rubber-capped vials, as needed, with the sterile 10-cc. syringe and dilutions made for dispensing. Where a hypodermic syringe and needle will be available for the withdrawal of the solution at the time of use, it is recommended that the solution of penicillin be dispensed in its original rubber-capped vial. However, if this is not possible or practical it should be transferred to a sterilized dropper bottle, with instructions on the label concerning the amount to be added by dropper to the diluent. There should be a minimum amount of contact to prevent contamination.

Preferable dilution strengths are a matter of opinion. In our studies we found 10,000 units of penicillin per cubic centimeter of sufficient strength to produce local effects. This, however, is the province of the physician and his duty to decide. Dilutions less than 10,000 units per cubic centimeter are not recommended at this institution.

Methods of Administration

The apparatus needed for administration of the penicillin vapor consists of a cylinder of oxygen, a regulator, tubing, vaporizer and nasal mask. Upon return, the tubing and vaporizer should be dispensed again only after being sterilized, to avoid transmitting an infection from a previous user.*

When ready to start the treatment, 1 cc. of the penicillin solution is placed in the vaporizer (A—*see diagram*) which is then inserted into the nasal mask (B). Then the patient applies and holds the mask securely to his face. By pressing valve (C) only when inhaling, and releasing it when exhaling through the mouth, vaporization takes place only when the vapor is actually being taken into the lungs. This avoids unnecessary condensation of the mist through blocking of the flow.

Nasal inhalation was chosen rather than the oral method because there is less area of turbulence. Turbulence in the nasal method occurs only at the glottis instead of in the entire oral cavity. There is also a better chance to reach nasal and sinus infections in this manner. This procedure is repeated every hour for the eleven-hour period, which comprises a total of twelve treatments of about five minutes each.

After the last inhalation for the day, the vaporizer should be removed and rinsed thoroughly in lukewarm water to remove any residue of the penicillin solution. If allowed to remain, a hard fungus-like substance forms in the small jets, which renders it useless. However, should this happen, place a few drops of hydrochloric acid in the vaporizer and blow through it to dissolve and remove the obstruction.

The apparatus† as used is set for 6 liters of oxygen per minute. The small tank, which is refillable, will last the day's treatment. The masks are inexpensive and therefore are disposable with no need for reclaiming and sterilization. The vaporizers†† are more costly, and therefore should be loaned to the patient and charged to him if broken or damaged. The entire unit is designed and assembled so that it can be rented by the day at a specified rate.

* A solution recommended for this purpose is Aro-Brom in a 5% dilution for thirty minutes.

† Distributed by Greene & Kellogg, Inc., 165 Ashland Avenue, Buffalo, N. Y.

†† Distributed by Vaponefrin Company, 6812 Market Street, Upper Darby, Pa.

General Comments

The simplicity and ease of administration of penicillin by this method are its best recommendation. The application is painless and may be used, at the discretion of the physician, for any of the conditions indicated.

The low cost of the equipment makes rentals inexpensive to the patient and may at the same time be profitable to the institution or retail pharmacist. Replacement parts are also available at low cost.

The range of diseases for this treatment is wide. But aside from local application for respiratory infections, all systemic results should be gauged by rates of absorption into the bloodstream.

The clinical results of local treatment will best indicate the length of time necessary to complete a course of treatments. Sputum tests should be taken at intervals to ascertain progress or improvement. Whenever possible, x-ray photographs of the lungs should be taken, in the diseases where indicated, before and after treatment over a two-week period. The entire procedure must of course be directed by a physician.

Treatment by penicillin vapor, or mist, offers to the pharmacist and physician a new opportunity for cooperation either in hospital or general practice. Properly used and controlled it can be advantageous to the patient, the physician and the pharmacist. On all three depends the success of the treatment, which we hope will encourage and reveal other progressive and helpful adaptions of this remarkable drug.

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———℞———

Twenty-eight pharmacists of *Perth Amboy, N. J.*, contributed $1560 as a community service to cover the cost of one of the new rooms at the Perth Amboy General Hospital.

JOINT PROGRAM ADOPTED TO AVOID TROPICAL ILLS IN U. S.

All possible precautions against introduction of new tropical diseases into this country through deployment of troops will be taken by means of a joint military quarantine program of the Army, Navy and U. S. Public Health Service.

Immunization, high standards of sanitation and other precautionary measures will also help to minimize the danger, Col. O. R. McCoy, director of the Tropical Disease Control Division in the Office of the Surgeon General, announces.

To reduce the number of secondary cases of malaria, all soldiers taking suppressive treatment for malaria when they return to this country are required to continue to take the drug for twenty-eight days after their return. Dengue, sandfly fever and scrub typhus offer little hazard as these diseases are limited in their course and do not recur.

It has also been found that the incidence of carriers of bacillary dysentery are "extremely low" in military personnel, and that the chances of transmitting filariasis in the United States are "very slight."

Troops are examined before departure from abroad and after arrival in this country to screen out any who have acquired communicable diseases. New regulations are also aimed at preventing introduction of disease through infected animals, plants or insects.

SPANISH HONOR E. F. COOK

Honorary membership in the Spanish Royal Academy of Pharmacy of Madrid has been conferred on Prof. E. Fullerton Cook of Philadelphia, chairman of the U. S. P. Revision Committee. Presentation of the membership certificate and a decoration was made through the Spanish government following a dinner held at its Embassy in Washington.

PHARMACIST WILL HEAD HOSPITAL

Leon N. Hickernell, pharmacist, has been named director of the University Hospital, Augusta, Ga. At one time Mr. Hickernell was chief pharmacist and head of the purchasing department at Cleveland City Hospital, later serving as assistant director. More recently he was employed as first assistant director of the New Haven Unit of Grace-New Haven (Conn.) Community Hospital.

PRESCRIPTION Information SERVICE

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SOLUTION OF EPHEDRINE

What is the procedure in filling the following prescription?

Ephedrine alk. 1%
Gluconic acid, q. s.
Isotonic dextrose sol. ..... ℥i

—*R. D., New York*

Evidently the physician wished to have a gluconate salt of ephedrine prepared, or he may have believed that the salt of ephedrine was necessary to obtain solution. The latter, however, is not the case since ephedrine alkaloid is quite soluble in water. Therefore, if it is possible to contact the physician, it would be wise to learn just what he wished in this respect. If the salt is to be prepared, one would use approximately equal quantities of gluconic acid and ephedrine. Isotonic dextrose solution would contain about 5½% of dextrose. The Pharmacopœia does not offer a solution of definite strength as far as dextrose is concerned, simply recognizing solutions of any strength by a general monograph.

COLOR FOR PRESCRIPTION

Please offer suggestions for the compounding of the following prescription:

Powdered extract cascarine	gr. ½
Menthol	gr. ¾
Sodium citrate	gr. 20
Beechwood creosote	♏ 8
Honey	
Glycerin āā	℥ 2
Oil eucalyptus	♏ 5
Syrup wild cherry, q. s. ad	℥ 1

It has been requested that this prescription be dispensed with a red color. Our difficulty is with coloring, which seems to be the cause of a sediment and separation.—J. S., Washington

Solution of Amaranth U. S. P. seems to provide a satisfactory color for your prescription. There is, however, a slight separation of material at the surface of the prescription which is apparently oil of eucalyptus, or possibly the oil mixed with menthol and creosote. This material is not entirely soluble in an aqueous mixture and naturally will separate, but it mixes readily upon shaking. We find no further incompatibility and no essential difference between the prescription containing the Solution of Amaranth and one without it, except as to color.

PREPARING STERILE OINTMENT

Where can I obtain the ingredients for the following formula in sterilized condition, or how does one go about sterilizing the ingredients?

Lanolin, sterile	47
Cold cream, sterile	47
Sulfanilamide, sterile	6

—*A. K., New York*

This formula can only be conveniently prepared by aseptic manipulation. The ingredients are sterlized separately, compounded aseptically and dispensed in a sterile container.

The sulfanilamide powder can be purchased already sterilized, or it can be sterilized in a hot-air oven at 140° C. to 150° C. for four hours.

The lanolin and cold cream can be sterilized in a hot-air oven at 160° C. for one hour. This may affect slightly the lanolin in that its color will be

darker and there will be a change in consistency, both of which may not be objectionable. If some change will not be acceptable, 140° C. for four hours will have to be tried. The sterile container is sterilized in a hot-air sterilizer at 160° C. for at least one hour. The preparation is prepared by aseptic manipulation and preferably dispensed in lined collapsible tubes. If dispensed in an ointment jar, the sterility may be affected when the latter is opened.

Additional information concerning the sterilization of the sulfanilamide powder and the process of aseptic manipulation may be found on pages 275, 331 and 344 of "Bacteriology and Allied Subjects" by Louis Gershenfeld, published by the Mack Publishing Company, Easton, Pa. ($6).

INKS FOR WRITING ON METALS

Could you furnish me with a formula for an ink for writing on metals?—J. S., Illinois

An ink suitable for writing on metal, glass or celluloid is prepared as follows:

Dissolve 20 parts of rosin in 150 parts of alcohol and add the resulting solution drop by drop, with continuous stirring, to a solution of 35 parts of sodium borate in 250 parts of water. Finally dissolve sufficient methylene blue to obtain the desired tint.

An indelible ink for glass or metal, recommended by Schobel, is as follows:

Sodium silicate, 1 to 2 parts; liquid India ink, 1 part; water as needed.

If a white ink is desired instead of black, the following has been suggested:

Sodium silicate, 3 to 4 parts; Chinese white or barium sulfate, 1 part; water as needed.

Containers for the inks should be kept airtight.

SULFATHIAZOLE HYDROLYZED

In compounding the following prescription a yellow coloration was observed after several days. This yellow color was due to the addition of sodium sulfathiazole. What is the nature of the reaction? Is the quality of the medication impaired by the color change?

Sodium sulfathiazole	10.0%
Antipyrine	5.0%
Benzocaine	0.5%
Glycerin, q. s. ad	100.0

—A. B., Wyoming

The yellow color of this prescription is undoubtedly due to hydrolysis of the sodium sulfathiazole. The sodium salts of the various sulfonamides are not permanent in solution and should only be prepared in this form for immediate use. The decomposition of the material would, of course, be expected to render the preparation inert as far as this specific drug is concerned. The preparation of smaller quantities might be satisfactory in this case, and storage in a cool place protected from light would help to retard hydrolysis.

SCHAMBERG'S LOTION

What is the formula for Schamburg's Lotion?—W. G., California

"Schamberg's Lotion" no doubt originated with a Dr. Schamberg of Philadelphia, noted dermatologist who died many years ago. He formulated many lotions, some for application to the body for various conditions and others for use on the hair and scalp. One of his best known formulas, which is possibly the one intended, was also known as "Calmitan Lotion." It is prepared as follows:

SOLUTION NO. 1

Sodium phenolate	8 Gm.
Sodium biborate	8 Gm.
Triethanolamine	6 cc.
Distilled water, *q. s. ad*	200 cc.

Make a solution, using heat if necessary.

SOLUTION NO. 2

Oleic acid	16 cc.
Light liquid petrolatum	170 cc.

Mix the two solutions thoroughly until emulsified; add two drops of oil of bergamot and one drop of oil of lemon to each four ounces.

HOMOEOPATHIC DRUGS

Please advise what Homœopathic Pharmacopœias are available and where these can be obtained.—M. D., Canada

The official Homœopathic Pharmacopœia of the United States is published under the direction of the Committee on Pharmacopœia of the American Institute of Homœopathy. It is available at $6 from the printer, Otis Clapp and Son, Inc., 439 Boylston Street, Boston, Massachusetts. The first supplement to the current edition is available at $0.50.

INFORMATION ON BENTONITE

Please advise us where we may obtain additional information on bentonite.—B. M., North Carolina

Past issues of THIS JOURNAL contained extensive discussions of the pharmaceutical use of bentonite as follows: Fantus, 27: 878, 1938; Fantus, 28: 548, 1939; and Hubbard and Freeman, *Prac. Phar. Ed.*, 2: 78, 1941.

Typical Days

From the Secretary's Diary for November

—3rd—

BY TRAIN at 7 a. m. to Trenton, N. J., to meet Swain and Schaefer coming from New York, and then all by auto to Atlantic City where Dunning was sojourning at the Claridge. Here a five-hour meeting of the Finance Committee at which budget proposals were defended with facts and figures. The final recommendations to be made to the Council next week will constitute an all-time high for A. PH. A. anticipated income and expenditures, auguring well for a busy and fruitful year ahead.

—4th—

A Sunday devoted largely to meetings of the Trustees and House of Delegates of the New Jersey Pharmaceutical Association, and then the trip back to Washington. It is good to keep in touch with the problems of a typical state association while concentrating on national association affairs, for the events and thinking at the grass roots are the stuff of which national policies are made.

—5th—

All day and far into the night laboring with the staff on the heavy Monday mail, the agenda for the coming joint meeting of A. PH. A. and N. A. R. D. executive bodies, and the review of last minute reports of state pharmaceutical association resolutions and presidential recommendations.

—6th—

Today came President Moulton and Council Chairman Beal to go over reports and unfinished business in preparation for the Council meetings which start tomorrow. Later a meeting with Harvey Mack and Cy Fleck of the Mack Printing Company to review printing problems and mounting costs of preparation and distribution of the National Formulary and the JOURNALS. And the staff is all a-bustle in anticipation of the visit to our headquarters, for the next few days, of members of the Council from the various parts of the country.

—7th—

Today the start of an eventful four-day round of meetings with all but two members of the Council in attendance. Much of the morning devoted to listening to the interesting report of President Moulton on his Puerto Rico trip, and its resultant good will. Our territorial associates would have been greatly pleased to note George Moulton's effort to re-create the semitropical atmosphere for the occasion. The charts and photographs illustrating the itinerary and the warmth of the reception accorded were most complete.

After a buffet luncheon in our own quarters came long and earnest consideration of the ASSOCIATION'S future in the light of the recommendations of the Finance Committee with unanimous approval of the recommendations. Also approval of long range plans for the publications, the sections and the branches, all of which will serve to improve integration and efficiency.

—8th—

All this day with the Council, carefully reviewing the agenda for the joint meeting to be held tomorrow with the N. A. R. D. Executive Committee. Just before the noon recess there came Prof. Lynch of Temple University with pharmacy students William Spring and Leonard Russock, and Messrs. Rogers and Green of Wyeth, Inc., to sit briefly with the Council and note how the business of the ASSOCIATION is transacted. These students had won an intramural pharmacy week window display contest at Temple University College of Pharmacy. The prize was a visit to Washington, and we were glad to welcome them.

At six o'clock to the Statler Hotel for a joint dinner of the Council with the executive committee of the Association of Colleges of Pharmacy who were also in session in Washington these days. A good talk by Col. John M. Andrews of the National Selective Service Administration telling why pharmacy students cannot be deferred just now. Later, until midnight discussing problems of mutual interest in the field of pharmaceutical education on a long agenda.

—9th—

A very profitable day spent in a well-conducted joint session of the A. PH. A. Council and N. A. R. D. Executive Committee with George Beal presiding, and very little of importance to pharmacy in any of its phases omitted in the discussions. Then laboring far into the night with Swain, Christianson, Waller and Sonnedecker to formulate the resolutions

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which gave formal expression to the views of the Joint Conference.

—10th—

Now came the final session of the Council with careful review of Committee and Section reports submitted by mail and much business transacted to keep the fires burning until the membership can meet once more in annual convention.

Late in the afternoon a visit from Al Fritz of Indiana and Frank Moudry of Minnesota who had never been within the walls of the AMERICAN INSTITUTE OF PHARMACY, and found them, like many others, agreeably surprised at what they saw. Next a visit from Dean Lyman, one of pharmacy's most lovable characters and one who has created his own monument, the *American Journal of Pharmaceutical Education.*

—11th—

Breaking the Sabbath in Washington to expedite the dissemination of the results of the previous week's important meetings.

—14th—

All the morning in conference with members of the A. M. A. Council on Pharmacy and Chemistry at the Statler on problems involving more complete use of the metric system. Pooling information and experience with physicians Torald Sollman, Austin Smith, R. P. Herwick, Stuart Mudd and James P. Leake were pharmacists J. L. Powers, E. F. Cook and R. P. Fischelis, and there was fine agreement all around on a forward-looking program to extend the use of the metric system in formula and prescription writing. At lunch, and later, there was time also to discuss the ever troublesome question of trade-marked names for common drugs.

—16th—

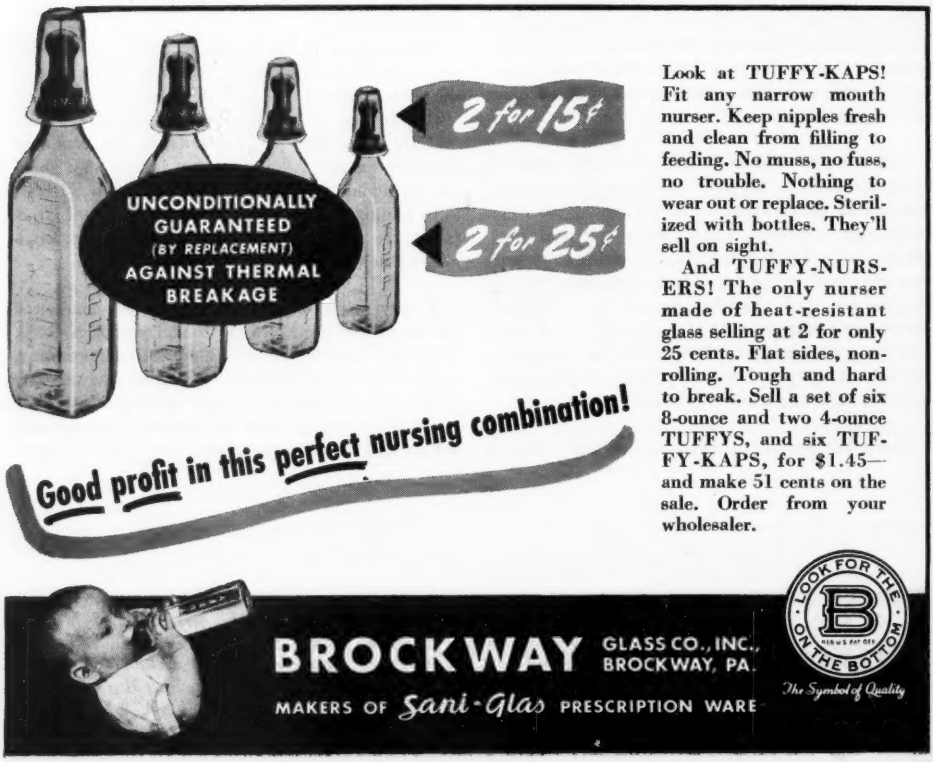
This morning came Dr. Hugh Cummings and Dr. Moll of Pan American Union's Medical Division to explore the possibility of using space in our building for some of their expanding activities, but we were sorry to point out our own increasing need for every inch of available floor space. Next a conference with Margaret Klem of the Social Security Board and Dr. Burt who is gathering data on medical care plans for us.

—17th and 18th—

Taking advantage of the week end free from telephone and other interruptions to catch up on necessary reading and writing. There is nothing like a quiet day for the planning of projects which have been in abeyance. Also work on the allocation of space for important activities which loom ahead, such as the membership drive and the enlarged publications.

—19th—

A day of mixed activity, with attention (*cont'd p. 50*)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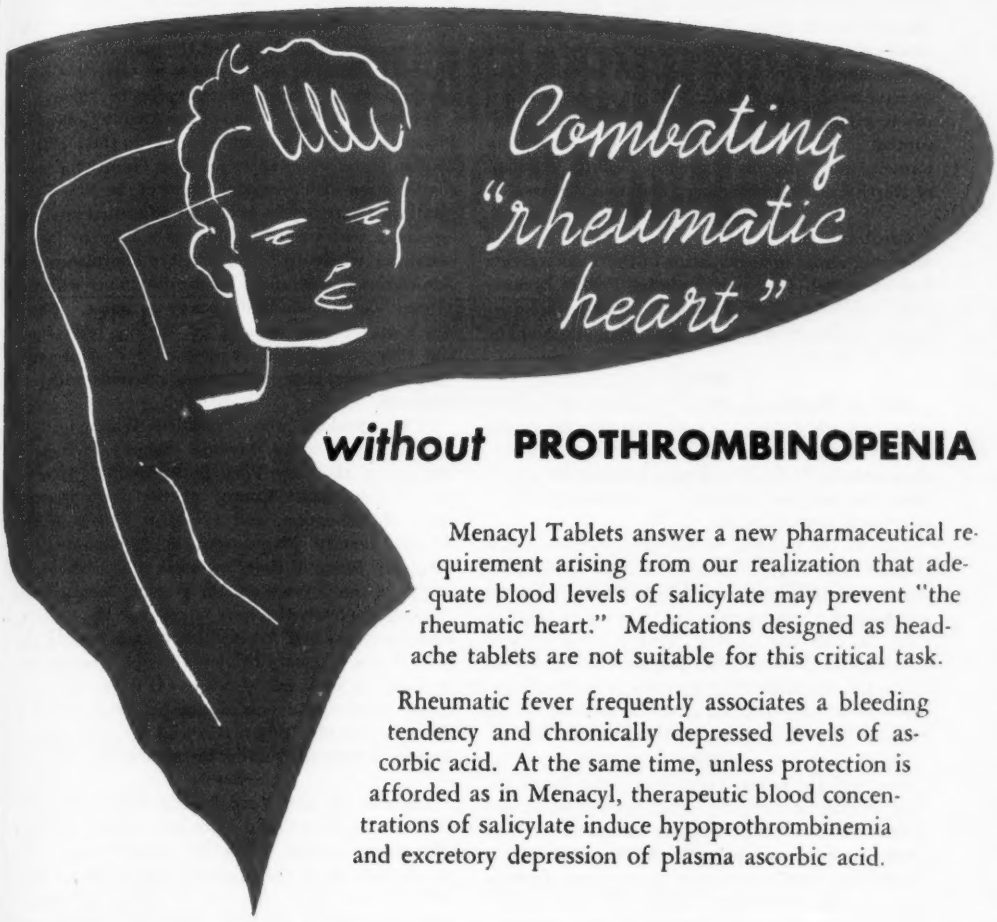

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to the receipt of furniture and fixtures for the lounge planned for our girls. In the day's many long distance calls there was one from Fred Lascoff in New York telling of the serious penicillin shortage, and we have worked hard with C. P. A. and other authorities to keep the flow of parenteral penicillin uninterrupted. This day also a most friendly letter from Grover Beard who has labored incessantly in behalf of North Carolina pharmacy these many years.

—20th and 21st—

Great diligence on the part of all to clear the desks and work ahead in anticipation of the Thanksgiving holiday which this year includes Friday because there was unanimous decision to work on holidays earlier in the month so that a long week end could be enjoyed by all.

—26th—

Back in Washington after several days of rest and recreation and finding the mail unusually heavy but filled with reports from far and wide on correspondence with the U. S. Civil Service Commission on the matter of adequate standards for admission to the pharmacists' examination.

Late in the morning to the office of Gen. Omar Bradley with George Frates to offer the cooperation of pharmaceutical organizations in looking after the problems of returning veterans. Sitting at the desk with this four-star General, hero of many a tough campaign in the world war just completed, one receives the impression that here is a man who knows where he is going and will guide the destinies of the Veterans' Administration with great capability.

—27th—

And still the letters come from irate deans and state secretaries enclosing replies from Senators and Representatives who thoroughly agree that the U. S. Civil Service Commission has missed the boat in establishing requirements for government pharmacists. A visit with Adley Nichols who came to look over U. S. P. material stored here and now to be removed to the Pharmacopœia's own recently purchased headquarters in Philadelphia.

—28th and 29th—

A busy morning at the office and then by the noon train to Newark, N. J., and from there via Lackawanna to Binghamton, N. Y., to be met by Mel Eaton of Norwich and Eaton Laboratories. The forty-mile drive from there to Norwich was quickly over, for there was much talk of the men and things associated with old "Medico-Chi" in Philadelphia where we were students "some" years ago. After a pleasant night and breakfast at Mel's magnificient home, early to the Norwich Laboratories to meet Maj. McCartney and many members of the research, control and production staff.

The tour of the laboratories, production line and warehouses proved unusually interesting. At luncheon with the executive staff there was much conversation on recent developments in medical care distribution and the new Eaton Laboratories' specialties now undergoing final clinical trial. Later some talk about industry cooperation in the program of the AMERICAN PHARMACEUTICAL ASSOCIATION, and then the forty-mile drive to Utica over an icy and treacherous highway, but the man at the wheel was very skillful at his job and so we arrived in time for the advance Empire State express to Albany.

Here came Dean O'Brien of the Albany College of Pharmacy to greet and transport us to the DeWitt-Clinton Hotel where there was opportunity for brief conversation with Secretary Jayne of the New York Board of Pharmacy on problems of mutual interest, especially barbiturate regulations. Then to Jack's restaurant where the Albany County Pharmaceutical Association had arranged a splendid dinner with the Albany County Medical Society as guest. There was a magnificent turnout of the two professions and they received the suggestions for cooperative effort in improving professional relations with enthusiasm.

Other speakers were President Wallingford of the Albany County Medical Society, Secretary Hannon of the New York State Medical Association, Commissioner Conroe of the State Department of Education, and President Cheris of the Albany County Pharmaceutical Association and Secretary Jayne of the New York Board of Pharmacy. Dean O'Brien was the gracious toastmaster.

While the festivities were in progress the up-state snowstorm reached Albany and on the way to the hotel it was necessary to plow through many inches of snow. A final chat with Dean O'Brien on educational matters and one cannot help but feel that there is splendid progress ahead for the Albany College of Pharmacy under his capable direction.

—30th—

Early to the New York Central depot to board a 7:50 a. m. train which did not arrive until 8:45 and thoroughly enjoyed seeing the snow-covered trees on the hills along the majestic Hudson as we sped toward New York. One never makes this trip in daylight, passing the great Palisades, without remembering the biblical reference to the eternal hills.

ALABAMA ALLIED HEALTH COUNCIL HOLDS CONFERENCE

The Allied Health Council of Alabama, which the Alabama Pharmaceutical Association helped organize, held a conference in Birmingham on November 27–28 devoted to discussions of the state's health status and methods of improving it. Represented on the program were both state and national health authorities.

Mrs. Thelma Morris Coburn, secretary of the Alabama Pharmaceutical Association, serves as secretary-treasurer of the Health Council, which includes medicine, dentistry, pharmacy, nursing and hospital services. E. W. Gibbs, Birmingham pharmacist, is a member of the executive board.